AN OBSERVATIONAL STUDY TO COMPARE THE EATING BEHAVIOR AMONG THE DIABETIC AND THE NON-DIABETIC PATIENTS ATTENDING OPD IN NAZARETH HOSPITAL, MOKAMA, BIHAR.

BY

30083603

A DISSERTATION SUBMITTED TO THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING

MARCH – 2010

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30083603

Research Advisor: _____

Prof. Dr. JEYASEELAN MANICKAM DEVADASON, R.N., R.P.N., M.N., D.Lit., Ph.D.,

Clinical Speciality Advisor: _____

Prof. Mrs. JESSIE SUDARSANAM, M.Sc., (N)., HOD – Medical Surgical Nursing

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING FROM THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI.

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CERTIFIED THAT THIS IS THE BONAFIDE WORK OF

30083603

AT THE ANNAI J.K.K. SAMPOORANI AMMAL COLLEGE OF NURSING

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF NURSING FROM THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI.

Examiners:

1. _____

2. _____

_____

Dr. JEYASEELAN MANICKAM DEVADASON,
R.N., R.P.N., M.N., D.Lit., Ph.D.,
DEAN, H.O.D., Nursing Research,
Annai J.K.K. Sampoorani Ammal College of Nursing,
Komarapalayam.

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DEAN, H.O.D., Nursing Research,
Annai J.K.K. Sampoorani Ammal College of Nursing,
Komarapalayam.

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From the old things to the new

Keep me traveling along with you my GOD"

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INTRODUCTION

"Everyone should eat and drink and enjoy the good of all his labour,
It is the gift of God"
Ecclesiastes Ch. 3:13

BACKGROUND OF THE STUDY

Diabetes Mellitus is a chronic disorder of glucose intolerance. It is characterized by high blood glucose level and glycosuria resulting from dysfunction of pancreatic cells and insulin resistance. Diabetes is spreading worldwide as an epidemic. Diabetes is a disorder in which the body cells fail to take up glucose from the blood. Wasting of tissues is seen as glucose-starved cells are forced to consume their own proteins. Diabetes is the cause for blindness, Kidney failure and amputation in adults. Individuals with diabetes lack the ability to use the hormone insulin.

Many factors are involved in the etiology of Diabetes Mellitus. Heredity, age, obesity, diet and sex are the major contributors other factors which help in development of the disease are sedentary life style, socio- economic status, hypertension and various forms of stresses.

As we start eating food, our body starts producing insulin. The insulin signal attaches to a special receptor on the cell surface, to make the cell turn-on its own glucose transporting machinery. It had been observed that type 2 diabetics have normal or even elevated levels of insulin in their body with normal insulin receptor but, due to some unknown reason, the binding of insulin to the cell receptors does not starts the glucose transporting machinery, which it is supposed to do. Special proteins called IRS (Insulin Receptor Substrate) are inside the cell. In type 2 diabetes, something is interfering with the action of the IRS protein and it is estimated

that about 80% of those who develop type 2 diabetes are obese. When insulin attaches to the receptor protein, the receptor responds by adding a chemical called a phosphate group onto the IRS molecules due to which the IRS molecules turn into action.

Overweight and obesity are both labels for series of weight greater than what is generally considered healthy for an individual. BMI ranges for children and teens above a normal weight have different labels (at risk of overweight and overweight). Excess body weight is implicated as a risk factor for many disorders including heart disease, cancer, diabetes, female infertility, prostate enlargement, uterine fibroids, gallstone and gestational diabetes etc. The location of fat deposits in the body leads to different risks associated with it. Increased abdominal fat can be estimated by waist size.

Dozens of controlled clinical trials have been carried out to determine the effect of weight loss on fasting blood glucose. They found weight loss produced by lifestyle modification declines blood glucose levels and HbA1c in type 2 diabetics. Glucose tolerance can be improved in overweight individuals by decreasing abdominal fat. Glucose tolerance can also be improved in overweight individuals with increased cardio respiratory fitness.

Many approaches have been used to reduce the incidence rate of the disease. The most popular approaches are drug therapy, dietary therapy and recently natural herbs and the natural products therapy .Drug therapy is the most common approach but it is costly and has many side effects. Dietary therapy is natural, economical and more feasible. Proper diet intake and eating behavior can stop the incidence of the diseases and can contribute towards decreasing the number of cases. Different approaches have been used to reduce the incidence rate of the disease. The most popular approaches are drug therapy, diet therapy alternative systems of medicines and the complementary system of medicines.

The food quality and diabetes mellitus has close association with each other. The broad aims of dietary prescription for people with diabetes are first to abolish the primary symptoms.

Secondly, to minimize the risk of hypoglycemia and thirdly to minimize the long-term macro-vascular and micro - vascular complications which together result in morbidity and shortened life span with all types of diabetes. Diet therapy in diabetes is of precaution concerning diet composition, the amount speed of eating, chewing of food, distribution and timing of food intake.

Eating behaviour and diabetes mellitus seem to have a close link. There are two main types of diabetes mellitus depending upon its etiology and treatment. Diabetes involves autoimmune or idiopathic etiology. Factors involved are age, heredity, obesity, diet and sex are major contributors.

The diabetic diet should contain 60% carbohydrate, 20-25% of fat, and 15- 20% protein. The liberalization of the carbohydrate might facilitate the reduction of saturated fatty acids and cholesterol in the diabetic diet. Decreasing calorie intake results in weight reduction, which is beneficial.

Life style changes are one of the greatest challenges that force in managing the eating behavior. The life style appears to be related to differential rates of diabetes and obesity across cultures and within our culture overtime. People are always in a hurry to eat food, rather than enjoying it, which has led to many illnesses. It is believed that mastication has greater effect on controlling the sugar level and decreases craving for food. These differences in behavior reflect differences in the macro environment and environmental changes in the US, which may be leading to the increasing prevalence of obesity. It has been suggested that Americans live in an environment rendered unhealthful by their easy access to energy, dense food and an increasing number of devices. That reduces the energy expenditure. Modifying this environment through drastic changes in eating and physical activity may help.

Mastication or chewing is the process by which food is crushed and ground by teeth. It is the first step of digestion and it increases the surface area of foods to allow more efficient break down by enzymes. During the mastication process, the food is positioned between the teeth for grinding by the cheek and tongue. As chewing continues, the food is made softer and warmer, and the enzymes in saliva begin to break down carbohydrates in the food. After chewing, the food is swallowed.

Mastication is a repetitive sequence of jaw opening and closing with a profile in the vertical plane called the chewing cycle. Mastication consists of number of chewing cycles. The human chewing cycle consists of three phases. Opening phase: the mouth is opened and the mandible is depressed. Closing phase: the mandible is raised towards the maxilla. Occlusal or intercuspal phase: the mandible is stationary and the teeth from both upper and lower arches approximate.

In a study on perceived problem among the NIDDM patients, the perceived problems in maintaining diet control was high among male and female NIDDM patients whose blood sugar were elevated. The perceived problems in maintaining diet control among male patients was significantly associated with eating fast (P= 0.004) with marital status, and eating fast (P=0.001). Among female patients, the perceived problems in maintaining diet control was significantly associated with occupation (P= 0.047), eating snacks in between meals (p= 0.000), regular exercise (P= 0.000) and eating until fullness of stomach (P= 0.006). Raji. R., 2008.

NEED FOR THE STUDY

Diabetic Mellitus is the third leading cause of death in most developed countries. The number of cases of diabetics in the worldwide is estimated to be around 150 million. This number is predicted to double by the year 2025(A prevalence rate of 5.4%).In 2003, there were

189 million Diabetics in the world. The projected figure for 2025 is 324milion. WHO estimated 1.77 million. India is in the 10th place followed by China. (WHO 2002)

The country with the largest numbers of people with diabetes is India (40.9 million), followed by China (39.8 million), the United States (19.2 million), Russia (9.6 million) and Germany (7.4 million).Some other alarming diabetes statistics include the fact that there is one person in the world dying of diabetes every ten seconds. In addition, there will be two new diabetic cases in the world being identified every ten seconds. In addition, what is worse, these very same diabetes statistics tell us that by the year 2025, there will be as many as seven million new diabetic cases in the world. About 186,300 people younger than 20 years have diabetes—type 1 or type 2. This represents 0.2 percent of all people in this age group 1.6 million new cases of diabetes were diagnosed in people between the ages 20 years or older in 2007. 23.6 million Children and adults in the United States- 7.8% of the population have diabetes. Of this, 17.9 million are diagnosed, 5.7 million people undiagnosed, 5.7 million people pre- diabetic. (International Diabetes Federation, 2007)

India, today leads the world with its largest number of diabetic subjects in any given country according to (WHO 2003). India has 31,705,000 found that other than the genetic factors, obesity and sedentary life habits are the main reasons for Indians getting diabetes. (Ramachandran, 2002)

Eating well and exercising regularly may be the best way to avoid the excess weight gain. Many of us eat on the run, at our desks or in front of the television or computer. When our minds are on the other things as we eat, we may not, register the taste or the texture of the food. Eating plays an important role in reaching satiety and satisfaction. We need to concentrate on the food on the plate and the action of mastication for the better effect on our body. (Saxena 2006)

The dietary advice giving is an important part of dietary counseling. The study describes the role of the nurse where the nurses primarily offer dietary advice for patients. They give an extensive explanation of the effect of diet for their daily life. Diet and the way in which it is consumed play an important role. (Kiurer 2004)

A study on food selection and eating pattern in North Corolina, showed that eating behaviour and eating pattern were influenced by participant's knowledge on Diabetes management, self-efficacy social support and time management as mediating variables that can influence the eating behaviour and the dietary behaviour. (Savoca. M. 2001)

Dietary behaviour and diabetic care in which the intervention includes discussion groups and promoted behavioral change in dietary risk, physical exercise and basic diabetic knowledge. Dietary restriction includes diet composition, amount, distribution, and the timing of mastication. Diet must be acceptable and be formulated in a way to normalize body weight. (Albarran, 2006)

Patients and health professionals typically regard diet as the biggest problem in diabetic management. Although nutrition education and meal planning are necessary, they have not proved sufficient for helping people to overcome obstacles to dietary adherence. It is important to identify the type of situation that makes adherence barriers allow us to improve patient education and intervention efforts without the construction of adherence barriers. We can only teach people generalized information about diabetic self-care.

The way we eat was slowly being seen as a key area in obesity research, especially since the publication of studies highlighting a genetic variant linked to "feelings of fullness". His work, recently published in the Journal of Psychopharmacology, found that anti-obesity drug sibutramine worked by slowing down the rate at which obese patients ate. He said: "What the Japanese research shows is that individual differences in eating behaviour underlie over-

consumption of food and are linked to obesity". Other research has found evidence of this in childhood, suggesting that it could be inherited or learned at a very early age." He said that there was no evidence yet that trying to slow down mealtimes for children would have an impact on future obesity effect on controlling the sugar level and decreases craving for food. (Halford, J. 2006)

Mastication seems to have an effect on the level of blood glucose there are very few studies about problems in mastication and its relationship to the health. This knowledge can be utilized to motivate the clients as well as risky behavior towards the goal of prevention of Diabetes by life style modification. These disordered eating behaviors are culturally accepted and performed with significant frequency by a variety of groups.

The investigator found that there were approximately 25- 30 diabetic patients attending the OPD at Nazareth hospital. Mokama, Patna. It was noticed that most of them were ignorant of dietary information and were unable to adhere to the dietary changes related to poverty. Most of them were not practicing the good health practices. This motivated the investigator to conduct a comparative observational study to assess the eating behavior among diabetic and non-diabetic patients attending OPD at Nazareth hospital, Mokama, Bihar.

STATEMENT OF THE PROBLEM

An observational study to compare the eating behavior among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar.

OBJECTIVE

1. To compare the eating behavior between the diabetic and the non-diabetic patients.
2. To test the correlation between the BMI, blood sugar and eating behaviour among the diabetic and non-diabetic patients.

3. To test the association between eating behavior and selected factors among the diabetic and the non-diabetic patients.

HYPOTHESIS

H_1 : There will be a significant difference in the eating behaviour (number of mastication per minute, mastication per feed, time taken for the entire feed, and time taken per feed) between the diabetic and non- diabetic patients.

H_2 : There will be a significant difference in the amount of chapatti and vegetable eaten between the diabetic and the non- diabetic patients.

H_3 : There will be a significant correlation between the eating behaviour and BMI among the diabetic and the non- diabetic patients.

H_4 : There will be a significant correlation between the eating behaviour and blood sugar among the diabetic and the non- diabetic patients.

H_5 : There will be a significant association between total time taken for feeding and selected factors among the diabetic and the non- diabetic patients.

H_6 : There will be a significant association between the mean mastication and selected factors among the diabetic and the non- diabetic patients.

OPERATIONAL DEFINITIONS

1. Diabetic patient : Refers to, those individuals attending the OPD at Nazareth hospital, who were diagnosed to suffer from type II diabetes mellitus aged between 40-60 years.

2. Non- Diabetic Patient : Refers to, those individuals, attending OPD for health check-up at Nazareth Hospital, who are otherwise healthy and are not suffering from diabetes mellitus.

3. Eating behavior : Refers to, the act, practice, method, and the style of eating the food item. For the purpose of the study, eating behavior is classified as follows, amount of food eaten, total time taken for feeding, number of feeds in a minute, number of mastication per feed, number of mastication per minute, total time taken per feed. The behaviour was recorded with prior consent of the individuals.

4. Selected factors : Refers to those factors which are likely to influence the eating behavior such as age, sex, marital status, occupation, income, family type, Body mass index, blood glucose level, dietary teaching, speed of eating, food preference, eating full stomach, drinking water while eating, characteristic of ingestion, duration of illness and regularity in checking blood glucose level.

ASSUMPTIONS

1. The patients will co-operate with the investigator and would be willing to participate in the study.
2. Eating behavior will be observed and recorded on video camera will be genuine behavior of the patients.
3. Tool prepared for the study would be sufficient for collecting information regarding eating behaviour.

DELIMITATIONS

The study will be delimited to

1. Patients attending OPD in Nazareth hospital, Mokama, Patna.
2. Eating behavior will be recorded on a video camera.
3. Patients attending the OPD at the time of data collection.
4. Patients selected by sampling.

CONCEPTUAL FRAMEWORK

A conceptual framework is analogous to the frame of a house, just as the foundation supports a house. A conceptual framework provides rationale for predictions about relationship among variables in the research study. It is also frame of reference, which is a base for observation, definitions of concepts, research designed, interpretations and generalization, much as the frame that rests on the foundation defines the overall design of a house.

Polit and Hungler (1995) state that a conceptual framework is inter related concepts or abstractions, that are assembled together n some rational scheme by the virtue of their relevance to a common theme.

Conceptual frame work for the study was derived from Rosenstoch's Health belief model. It shows the relationship between the individual perceptions, modifying factors and likelihood of action. The first component of this model involves the individual's perception of susceptibility to an illness such as family history, sedentary life and dietary behaviour. After this link is recognized, particularly when one of the family members or friends have been suffering due to the seriousness of diabetes mellitus, such as prolonged wound healing, diabetic ketoacidosis, infection, amputation, coma and death, the person may perceive the personal risk of disease.

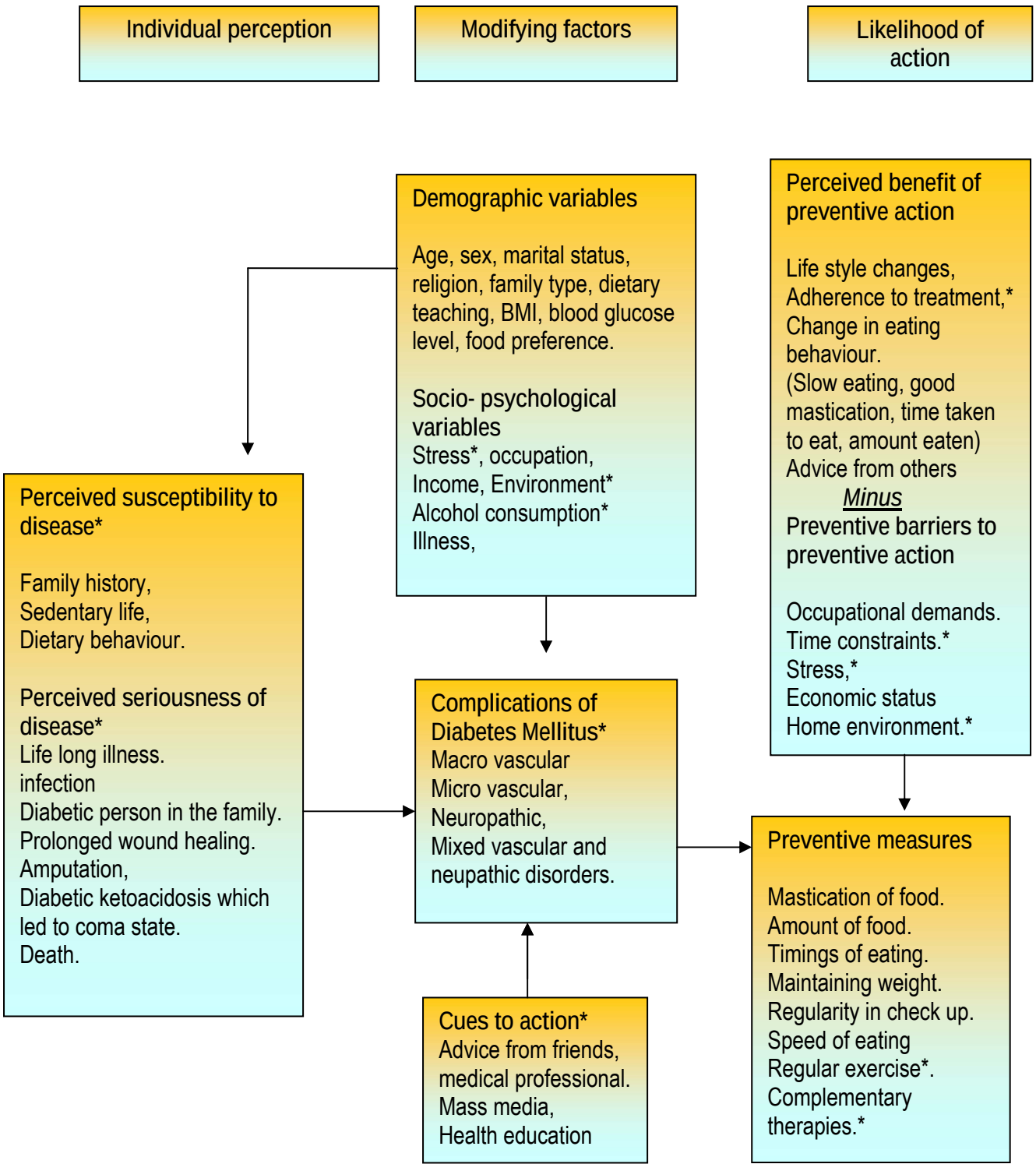
The second component is the individual's perception of the seriousness of the illness. This perception is influenced and modified by the demographic and socio-psychological variables, such as age, sex, marital status, education, BMI, blood glucose level, family type, duration of illness, and socio- psychological variables such as stress occupation, income, environment, alcohol consumption and illness. Perceived threat to illness is development of the complications of diabetes mellitus. They are macro-vascular, micro-vascular, neuropathic, mixed vascular and neuropathic disorders. And the cues to action

would be through advice from family, friends and medical professional, through mass media and health education. Which may affect the way he/she takes care of himself/ her.

The third component – the likelihood that the person will take preventive action – result from person's perception of benefits such as life style changes, adherence to treatment, change in eating behaviour (slow eating, good mastication, time taken to eat, and the amount eaten)and the barriers to taking action such as occupational demands. time constraints, stress, economic status and home environment. A clients perception of susceptibility to disease, as well as his or her perception of the seriousness of an illness will or will not partake in preventive measures such as mastication of food, amount of food, timings of eating ,maintaining weight, regularity in check up, speed of eating, regular exercise and complementary therapies.

Projected outcome

This health belief model will throw light on the aspect of understanding the factors influencing patient's perceptions, beliefs, and behaviours in order to plan care that will most effectively assist in maintaining health and prevention of illness.



* Not applicable.

Fig1: CONCEPTUAL FRAMEWORK BASED ON HEALTH BELIEF MODEL (Rosenstoch's Maiman's 1974)

CHAPTER – II

REVIEW OF LITERATURE

Literature review can search a number of important functions like identification of the topic, to ascertain what is already known, in relation to a problem of interest, to develop a broad conceptual context into which a research problem will fit and to suggest ways to going about the business of conducting a study on a topic of interest.

Literature review done for the present study is presented under the following heading.

I. Studies related to eating behaviour.
II. Studies related to mastication and obesity.
III. Studies related to eating behaviour and obesity
IV. Studies related to mastication and diabetes

I. STUDIES RELATED TO EATING BEHAVIOUR

Laurie & Barclay (2008) conducted a cross sectional survey From 2003 to 2006 in 2 communities in Japan, among 3287 adults (1122 men, 2165 women) aged 30 to 69 years which included overweight status, defined as a body mass index of 25.0 kg/m^2 or more, and dietary habits of eating until full as measured with a lifestyle questionnaire and speed of eating as measured with a validated brief self-administered questionnaire. They found that More than half of the men (50.9%) and women (58.4%) surveyed self-reported eating until full. Eating quickly was self-reported by 45.6% of the men and 36.3% of the women. Compared with the group of participants of both sexes who reported not eating until full and not eating quickly, the group who reported eating until full and eating quickly had the highest age-adjusted mean

values for height, weight, body mass index, and total energy intake. For eating until full the odds ratio (OR) of being overweight was 2.00, (95% confidence interval [CI], 1.53 - 2.62) for men and 1.92 (95% CI, 1.53 - 2.40) for women, after multivariable adjustment. For eating quickly, adjusted OR was 1.84 (95% CI, 1.42 - 2.38) for men and 2.09 (95% CI, 1.69 - 2.59) for women. For both eating until full and eating quickly Vs neither eating behavior, the multivariable OR of being overweight was 3.13 (95% CI, 2.20 - 4.45) for men and 3.21 (95% CI, 2.41 - 4.29) for women. They concluded saying that eating until full and eating quickly are associated with being overweight in Japanese men and women, and these eating behaviors combined may have a substantial impact on being overweight.

Ferester & Spiegel(2008) selected 18 participants of which 9 were lean (average BMI 25) and 9 were obese (average BMI 32), and fed them with turkey, tuna, and bagels and used EMG(electromyography) to measure the rate of jaw movements. He found that there was no difference between the lean groups compared to the obese group in terms of eating behaviour, feeling full, or being satisfied with smaller amounts of food. When people took smaller bites, they simply ended up eating longer. So essentially they still ate the same amount of food. He concluded saying that if one wants to eat less, then he will have to cut down the amount on the plate.

Kathleen J.et.al.,(2008)compared and studied the impact of slow and quick eating rates on development of satiation, in a randomized design, among 30 healthy women (22.9±7.1 years; body mass index [calculated as kg/m^2] 22.1±2.9) on two test visits to compare slow and quick eating rates. Satiation was examined as the main outcome, using the objective measure of energy intake during ad libitum meals. At designated times, subjects also rated perceived hunger, satiety, desire to eat, thirst and meal palatability on visual analogue scales. It was observed that slow rates of ingestion led to significant decreases in energy intake (quick: 645.7±155.9 kcal; slow: 579.0±154.7 kcal; P<0.05) and significant increases in water consumption (quick: 289.9±155.1 g; slow: 409.6±205.8 g; P<0.05). Despite higher energy

intake upon meal completion under the quick condition, satiety was significantly lower than the slow condition (P<0.05). Accordingly, the quick condition showed a lower Satiating Efficiency Index (quick: 0.1; slow: 0.2; P<0.05). After meal completion, pleasantness ratings tended to be higher under the slow condition (P=0.04; but not significant. Ad libitum energy intake was lower when the meal was eaten slowly, and satiety was higher at meal completion.

Chris (2008) in his article "Healthy Living" talks about "Why one should consider the simple act of Eating Slower". He says, one of the problems growing in our daily lives is that many of us rush through the day, with no time for anything as a result we have no time to get a bite to eat. We just gobble it down which leads to stress on our bodies, which is unhealthy living. With powerful act of eating slower, we can begin to feel better and reverse that lifestyle immediately. Take smaller bites, chew each bite slower and longer and enjoy your meal longer. It takes a few minutes extra each meal, and yet it can have profound effects. Just by eating slower, one will consume fewer calories in fact, enough to lose 15 pounds a year without doing anything different or eating anything different. The reason is that it takes about 20 minutes for our brains to register that we're full. If we eat fast, we can continue eating past the point where we're full. If we eat slowly, we have time to realize we're full, and stop. If you eat slower, you'll chew your food better, which leads to better digestion. Eating slowly, and paying attention to our eating, can be a great form of mind exercise.

John et al., (2007) assessed a cross-sectional study on 2704 male (mean age and BMI: 48.2 y and 23.3 kg/m^2) and 761 female (46.3 y and 21.8 kg/m^2) non-diabetic Japanese civil servants, 75% clerical, and 25% manual laborers, using a two-part questionnaire on life-style factors and diet history with self-assessment of categorical speed of eating and energy intake over a 1-month period. They measured BMI, blood glucose and insulin concentrations and calculated insulin resistance using the homeostasis model assessment of insulin resistance: (HOMA-IR).They found that BMI correlated with eating rate in both sexes, and with daily energy intake in men. Multiple regression analysis of log HOMA-IR by categorical speed

of eating, adjusting for age, energy intake and lifestyle factors showed a statistically significant gradual increase in HOMA-IR with increases in relative eating rate in men ($p < 0.001$, for trend) and in women ($p < 0.01$). Adjusting for BMI, this positive relationship appeared only in men ($p = 0.03$). The findings suggested that eating fast is independently associated with insulin resistance in middle-aged Japanese men and women.

Veyrune et al., (2007) shares about the characteristics of muscular activity in complete dental wearers and group of 15 subjects, of which 9 subjects under control group with normal dentition. Different food differing in hardness was given for mastication. The Electromyography (EMG) recordings were taken. With the help of one-way and two-way ANOVA and Student–Newman–Keuls post hoc test ($\alpha = 0.05$), mean comparisons were done. It was found that complete dentate wearers failed to increase EMG activity per cycle in response to hardness of the food and experienced difficulties during mastication, as indicated by a decreased masticatory rate and failure to increase EMG activity per cycle in response to increased food hardness.

Hui Ming et al.,(2006)conducted a study on 3737 male (mean age ± standard deviation and mean BMI ± standard deviation: 48.2 ± 7.1 years and 23.3 ± 2.7 kg/m^2) and 1005 female (46.3 ± 7.0 years and 21.8 ± 2.8 kg/m^2) Japanese civil servants. They measured self-reported categorical rate of eating, current BMI, BMI at age 20, and BMI-change from age 20and assessed energy intake over a 1-month period with a brief-type diet history questionnaire. They analyzed the findings with the multiple regression analysis in which the current BMI was regressed by categorical rate of eating, energy intake, age, and lifestyle factors showed that current BMI steadily increased by -0.99, -0.67, 0.81, and 1.47 kg/m^2 along with the progress of categorical rate of eating from the 'medium' group to 'very slow', 'relatively slow', 'relatively fast', and 'very fast' groups, respectively, in men. In women, the corresponding values were -1.06, -0.35, 0.50, and 1.34 kg/m^2. When the BMI increment from age 20 to current age was regressed in the same manner, the increment was -0.63, -0.34, 0.57, and 1.05 kg/m^2

in men and -0.71, -0.32, 0.34, and 1.14 kg/m^2 in women, respectively. Additionally, both BMI at age 20 and current height were positively associated with rate of eating. They concluded saying that among middle-aged men and women eating fast would lead to obesity.

Wodak et al,(2006) shares the experience of his study on adaptation of healthy mastication to factors pertaining to the individual or to the food with the help of Electromyographic and jaw movements (kinematic) recordings. The objective of this review was to provide an overview of the variations of the measured masticatory variables that occurred when mastication adapts to changes in characteristics of the individual or the food. Age, gender and dental state were considered as intrinsic factors whereas hardness, rheological characteristics (plasticity or elasticity), and food size were considered as extrinsic factors. Vertical and lateral amplitudes and, velocities of jaw movements, were given by kinematic recordings. The findings of the study revealed that bioelectrical activities per cycle or per sequence were closely linked to masticatory forces and were measured from electromyographic recordings. Number of cycles, sequence duration and masticatory frequency were measured from both types of recordings.

Bolton et .al., (2005) declared the results of his study on 631 dentate subjects aged between 37–80 years on whom he tested the multivariate model of masticatory performance. Explanatory variables included were number of functional tooth units, bite force, sex, age, masseter cross-sectional area, presence of temporo-mandibular disorders, and presence of diabetes mellitus. The Covariance structure analysis showed 68% of the variability in masticatory performance. Age and sex did not show a strong effect on masticatory performance, either directly or indirectly through masseter cross-sectional area, temporo-mandibular disorders, and bite force. Number of functional tooth units and bite force were confirmed as the key determinants of masticatory performance.

Michael , Dodd's & Chih-ko yeh., (2004) conducted a study on Health benefits of saliva which influences the oral health both through its non-specific physio-chemical properties, as well as through more specific effects. Increases or decreases in mastication may affect saliva output. The cross-sectional studies of saliva in a large population-based study cohort (*N*=1130) indicate that there is an age-related decline in saliva output for unstimulated whole, stimulated parotid, unstimulated submandibular/sublingual and stimulated submandibular/sublingual saliva, as well as some compositional alterations in anti-microbial and other proteins. Some of alterations also appeared to be specific for diabetes mellitus.

II. STUDIES RELATED TO MASTICATION AND OBESITY

Bridget et. al., (2008.) conducted a randomized, 3 arm, cross over study among 13 healthy adults on mastication of almonds: effects of lipid bio-accessibility, appetite, and hormone response. Each one was given 55gm of almond and chewed 10, 25 or 40 times. During the following 3 hours blood was collected and appetite was monitored. Under the same chewing conditions all foods were provided along with 55 grams of almonds. Fecal samples were also collected. It was found that hunger was acutely suppressed below baseline ($P < 0.05$), and fullness was elevated above baseline longer ($P < 0.05$) after 40 chews than after 25 chews. Two hours after consumption, fullness levels were significantly lower after 25 chews than after 40 chews and hunger levels were significantly higher after 25 chews than after 40 chews ($P < 0.05$).and insulin concentrations declined more rapidly after 25 and 40 chews than after 10 chews(both $p < 0.05$). Fecal fat excretion was significantly higher after 10 chews than after 25 and 40 chews (both $P < 0.05$). All participants had higher fecal energy losses after 10 and 25 chews than after 40 chews ($P < 0.005$). The results indicate important differences in appetitive and physiologic responses to masticating nuts and likely other foods and nutrients.

Hidehiko et.al.,(2005) conducted a study on 16 non- glucose tolerance subjects and 10 predisposed subjects to evaluate the effects of thorough mastication on postprandial plasma glucose concentrations in non-obese Japanese subjects in a crossover trail of 52 test meals. The study revealed that thorough mastication has the potential to affect postprandial plasma glucose concentrations by improving digestibility and absorption of nutrients. To evaluate the effects of mastication on postprandial plasma glucose concentration, they compared usual and thorough mastication in subjects with normal glucose tolerance. In the NGT group, thorough mastication reduced the postprandial plasma glucose concentration at 90 minutes ($P < .05$) and 120 minutes, ($P < .05$) and the area under the curve (AUC) from −15 to 180 minutes ($P < .05$) without an increase in the AUC for insulin. But in the predisposed group, thorough mastication significantly augmented plasma glucose and serum insulin concentrations than AUCs compared with usual mastication.

Muneki et. al (2003) conducted a study among twenty female AN patients and 10 age-matched female controls and subdivided into two subtypes based on Eating Pattern and the Effect of Oral Glucose on Ghrelin and Insulin Secretion in Patients with Anorexia Nervosa. 11 restricting type (AN-R), nine binge-eating and purging type (AN-BP) Subjects underwent an oral glucose tolerance test at 08·00 h. Blood was collected 0, 30, 60, 120 and 180 min after the glucose load. The findings of the study revealed both AN-R and AN-BP had a significant increased basal ghrelin level ($P < 0·01$) and a significantly decreased basal insulin level ($P < 0·05$) as compared to controls. The time of mean ghrelin in AN-BP (120 min, 58·1% of basal level, was delayed compared to controls (60 min, 60·2%, and in the AN-R group it kept decreasing for 180 min (80·0%). The peaks insulin levels in AN-BP (120 min), and AN-R (180 min,) were also delayed as compared to controls (60 min,). The glucose level at 180 min in AN-R was significantly ($P < 0·05$) higher than in controls.

Nanette et. al.,(2002) conducted a study on 624 Amish adults from 28 families and administered a standardized eating behavior inventory with the help of Heritability analysis and a genome- wide multipoint linkage analysis. The objective of the study was to investigate the genetic underpinning of eating behavior. Three quantifiable components of eating behavior were measured: restraint, dis-inhibition, and hunger. Association between eating behavior scores and physical characteristics were evaluated. Eating behavior scores were associated with obesity and obesity related phenotypes. The linkage analysis showed 4 regions of suggestive linkage. The study concluded that there was significant familial effect on eating behavior and suggestive genetic linkage among Amish adults.

III. STUDIES RELATED TO EATING BEHAVIOUR AND OBESITY

Ryan et al.,(2008) Assessed the relationship between an abnormal eating behaviour (AEB) and diabetes in a sample of 94 consecutively recruited French adult patients with type 1 DM and type 2 DM and administered a series of validated questionnaires. The study findings were as follows over one-fourth of men with T1D (26%) or T2D (27%) and 11% of female T2D patients reported consistent and pathological overeating or binge-eating during the previous six months. Glycaemic control in these T1D patients was poorer than in T1D patients defined as normal eaters (NORM) (11.9% *versus* 9.6%), but had no statistical significance *(P* = 0.08), and no significant difference was observed in the T2D group (*P* = 0.61) either. T2D patients reported being markedly more restrained when eating than did the T1D patients (*P* = 0.002), and their restraint increased along with their BMI (*P* < 0.001). Patients who overate or binged also reported greater general hunger (*P* = 0.02) and dis-inhibition (*P* = 0.003) than did the NORM patients. AEB was present in French diabetic patients at levels that were probably higher than among the general population. Study highlighted the need for greater awareness among diabetes clinicians of the problem; regular screening of diabetic patients for AEB; and adaptation of therapeutic and dietary recommendations for this patient subgroup.

Brian Collin & Payne (2008) observed the eating behaviors and recorded the height, weight, sex, age, and behavior of 213 persons at Chinese restaurants and then compared across BMI levels various seating, serving, and eating behaviors. People with higher levels of BMI were more likely to be associated with using larger plates vs. smaller plates (OR 1.16, $P < 0.01$) and facing the buffet vs. side or back (OR 1.10, $P < 0.001$). People with higher levels of BMI were less likely to be associated with using chopsticks vs. forks (OR 0.90,$P < 0.05$), browsing the buffet before eating vs. serving themselves immediately (OR 0.92, $P < 0.001$), and having a napkin on their lap vs. not having a napkin on their lap (OR 0.92, $P < 0.01$). People with lower BMI's left more food on their plates (10.6% vs. 6.0%, $P < 0.05$) and chewed more per bite of food (14.8 vs. 11.9, $P < 0.001$).

Patricia (2008) conducted a cross-sectional, case-controlled study of 101 girls with type 1 diabetes, ages 9–14 years, and 303 age-matched, female non-diabetic control subjects in order to compare the prevalence of eating disturbances in preteen and early teenage girls with type 1 diabetes to their non-diabetic peers. Participants completed a Children's Eating Disorder Examination interview. Socioeconomic status, BMI, and diabetes-related variables were assessed. Groups were compared using λ^2 analyses. They found that Binge eating; the use of intense, excessive exercise for weight control; the combination of two disturbed eating-related behaviors; and sub threshold eating disorders were all more common in girls with type 1 diabetes and metabolic control was not related to eating behavior. They concluded saying that eating disturbances, though mostly mild, were significantly more common in preteen and early teenage girls with type 1 diabetes. Screening and prevention programs for this high-risk group should begin in the preteen years.

Corby K. et.al., (2007) used direct eating behavioral observation of participants' (n=48; 25≤BMI≤35) by using Universal Eating Monitors. Food intake and ratings of "desire to eat" (collected each minute during meals) were represented as a function of time. Based on an acclimation meal, participants' eating rate was modified by instructing them to eat a bite of food when prompted by a computer, which generated three types of meals: (1) baseline (eating rate

was the same as the acclimation meal), (2) reduced-rate (eating rate was reduced by 50%), and (3) combined-rate. Slower eating rate during the reduced-rate and combined-rate meals resulted in less food intake compared to the baseline meal for men, but not women. Ratings of desire to eat, normalized for the amount of food consumed, were lower during the combined-rate meal for men and women. Thus, this basic premise of behavioral weight control was supported for men, but not for women.

Straub et al;(2006) investigated a cross sectional study on 72 patients of which 31 were Type I DM and 41 were Type II DM to find the association between eating behaviour and current Glycaemic control, body mass or autonomic nervous function, and monitored body mass index (BMI), serum cholesterol, serum triglycerides, hemoglobin A1c (HbA1c) and autonomic nervous function (seven standardized tests). Cognitive control of eating behaviour (CC) and susceptibility to eating problems (SEP) was investigated by using three-factor eating questionnaire. They found that there was a correlation between SEP and age (r=−0.536, P<0.01), SEP and duration (−0.441, P<0.05), SEP and HbA1c (0.438, P<0.05), and between CC and duration (−0.371, P<0.05) and CC and HbA1c (0.376, P<0.05) among the Type I DM patients and correlation between SEP and BMI (0.401, P<0.01) and between CC and BMI (0.429, P<0.01) among type II DM. They also found that Low CC was associated with autonomic nervous dysfunction in type I DM (P=0.022) and autonomic nervous dysfunction was associated with high SEP (P=0.044) among type II DM. They came to a conclusion saying that correlation between eating behaviour and HbA1c or triglycerides in type I DM indicates that the questionnaire is able to address current parameters of diabetes control. Self-assessment of eating behaviour in type I and type II diabetic patients revealed associations between eating behaviour and autonomic nervous function.

Lucassen et al., (2006) assessed the relationship of eating behaviour to changes in fat and energy intake among restrained, emotional and external eating behaviour in a cohort of patients newly diagnosed with Type 2 diabetes and compared them with the general

population. They calculated correlation coefficients and used a stepwise multiple regression model with energy and fat intake or changes in energy and fat intake as dependent variables, on the three different types of eating behaviour at diagnosis between energy and fat, intake at diagnosis and changes in energy and fat intake between diagnosis and both at a interval of 8 weeks and 4 years later. They found that the distribution of the three types of eating behaviour was similar in patients with Type 2 diabetes and the general population. Emotional and external eating was associated with increased intake of energy and fat. Conversely, restrained eating showed an inverse correlation with energy and fat intake. External eating, but not emotional eating, showed a statistically significant relation with a decrease in energy intake in women. The study showed statistically significant correlations between eating behaviour (measured at diagnosis) and changes in energy and fat intake between diagnosis and 4 years. Besides this it was found that at diagnosis, external eating behaviour and emotional eating behaviour were associated with high-energy intake and restrained eating behaviour with low-energy intake. Women with high scores for emotional eating behaviour seem to be less able to make initial dietary changes after being diagnosed and having received dietary advice.

Bernardo et al.,(2002) assessed the eating behavior by using the Eating Disorder Examination (EDE 12.0D), among obese patients with type 2 diabetes, and compared it to non-diabetic subjects with a series of 156 (76 -65male, 80 female) overweight and obese type 2 diabetic patients, aged 30 years , with a body mass index (BMI)>28 kg^2 (DM); and a series of 192 (20 male, 172 female) obese (BMI>30 kg^2) non-diabetic -65 yearspatients aged 30 seeking treatment for weight loss and a non-clinical sample of 48 (22 male, 26 female) obese (BMI>30 kg^2-65 years) subjects aged 30 selected from the lists of two general practices and assessed the prevalence of eating disorders and of eating disorder symptoms. They found that the prevalence of Binge Eating Disorder was lower than 5% in all the three samples. Median EDE scores in females were significantly higher in OC (3.0) and OP (3.4) than in DM (1.7), while diabetic patients showed higher scores on Restraint than both non-diabetic samples. Among diabetic patients, a significant correlation of EDE scores with HbA_1c was observed.

They concluded saying that the Type 2 diabetes is unlikely to induce relevant eating disturbances in obese patients, apart from an increase in restraint and abnormalities of eating attitudes and behavior are associated with an impairment of metabolic control.

IV. STUDIES RELATED TO MASTICATION AND DIABETES

Foltin. R., (2009) explains the "Satiation test" which measures the amount of food required for a person to reach a comfortable level of satisfaction with eating, and also the rate at which satiation develops while eating. He says that the individual eats a large fixed amount of food (usually 975 g) and the rating done by a series of feelings and sensations by means of validated questionnaire.

Foltin. R., (2009) talks about "Controlled eating rate maneuver". The purpose of this maneuver was to test hypotheses about the contribution of rate of eating to amount consumed, and to test the possibility that training subjects to eat at a certain rate might be therapeutic for eating disorders. The subjects were asked to eat at a rate that kept liquid in a small reservoir at a fixed level. As the subjects ate, liquid food was pumped into the reservoir at a controlled rate. The subjects were asked to eat at the rate predetermined by the pump. The end point was a subject's intake of the meal, or the amount subjects ate before reporting 'satisfaction' and while they were periodically interrupted as in the satiation test to make ratings of feelings and sensations.

Elizabeth & Karen (2008) talk about fast eaters who get fat. She says that eating slowly could help with the battle of the bulge. She talks about a study on 3000 Japanese adults published in the British medical journal the findings of which suggest that those who ate their meals quickly were about twice as likely to be obese as their slow-munching counterparts. People who ate quickly and who ate until they were full were three times more likely to be obese. The research supports previous evidence that people tend to consume more calories

when they eat quickly. But also that eating quickly is linked to obesity. Regardless of how many calories are eaten, people can learn to eat more slowly and recognize their internal cues for fullness. Setting aside meal times and chatting between bites can help slow the rate of eating and allow your body to send fullness signals before you've over eaten.

Torres & Nowson (2007) talk about relation between stress, eating behavior, and obesity. They say that stress influence human eating behavior and to alter food intake in two ways, resulting in under or overeating, which may be influenced by stressor severity. Chronic life stress seems to be associated with the greater preference for energy and nutrient- dense foods, namely those that are high in sugar and fat. Evidence from longitudinal studies suggests that chronic life stress may be casually linked to over weight gain, with a greater effect seen in men. Future studies that measure biological markers of stress will assist our understanding of the physiological mechanism underlying the stress eating relation and how stress might be linked to neurotransmitters and hormones that control appetite.

Lassauzay et. al., (2007) observed the eating habits of 3,000 people and reported their findings saying that Problems in signaling systems which tell the body when to stop eating may be partly responsible. Deliberately slowing down at mealtimes might impact on weight. The latest study looked at the relationship between eating speed, feelings of "fullness" and being overweight. Half of the 3,000 volunteers told researchers that they tended to eat quickly. Compared with those who did not eat quickly, fast-eating men were 84% more likely to be overweight, and women were just over twice as likely. Those, who, in addition to wolfing down their meals, tended to eat until they felt full, were more than three times more likely to be overweight.

Lumeng J& Hillman, K., (2007) measured a Crossover study among preschool 54 children, aged 2.5–6.5 years to determine whether children's food consumption increased by the size of the group of children in which they are eating. The individual child consumption was

calculated in grams. Amount eaten and snack duration were correlated (r = 0.71). The association between group size and amount eaten differed in the short (<11.4 min) versus the long (≥11.4 min) snacks (p = 0.02 for the interaction between group size and snack duration). During short snacks, there was no effect of group size on amount eaten (16.7 (SD 11) g eaten in small groups vs 15.1 (6.6) g eaten in large groups, p = 0.42). During long snacks, large group size increased the amount eaten (34.5 (16) vs. 26.5 (13.8), p = 0.02). Children consumed 30% more food when eating in a group of nine children than when eating in a group of three children during longer snacks. The finding of the study says that social facilitation of food consumption operates in preschool-aged children.

Harry (2006) enabled investigators to examine biomarkers, with an emphasis on behaviors that could potentially become phenotypes for control of food intake in humans. Behavioral biomarkers include the size of a meal eaten under controlled conditions, rate of eating, and the report of feelings related to physiological biomarkers such as visceral stimulation by food, the physiological states of organs, the change in hormone levels, or gastric emptying induced by eating, microstructure of eating, and indicators of motivation to eat, such as pressing a computer key for food, other items, or money. By providing a controlled laboratory setting for collecting measures of both types of biomarkers, hypotheses was tested about the mechanisms that underlie normal and disturbed eating behavior, particularly in patients with obesity. The behavioral measures constitute a category of "behavioral assay", to quantify such factors as amount consumed in a test meal, or effort expended to get a certain amount of food reward.

Kwheaton, et.al., (2006) administered wheat, maize, and oat test meals to volunteers and tried to find its effects on plasma glucose and insulin responses and on the rate of starch digestion in vitro. When normal volunteers ate wheat based meals, their plasma insulin responses increased step-wise. The findings of the study showed that insulin responses were greater with fine maize meal than with whole or cracked maize grains but similar with whole

oats, rolled oats and fine oatmeal. Oat-based meals smaller glucose and insulin responses than wheat- or maize-based meals. He concluded saying that Particle size influences the digestion rate and consequent metabolic effects of wheat and maize but not oats. The increased insulin response to finely ground flour may be relevant to the etiology of diseases associated with hyperinsulinemia and to the management of diabetes.

McDonald. I., (2005) from the University of Nottingham, said that there were a number of reasons why eating fast could be bad for weight. He says, it could interfere with a signaling system which tells brain to stop eating because stomach is swelling up. He said: "If you eat quickly you basically fill your stomach before your gastric feedback has a chance to start developing - you can overfill the thing." He said that rushing meals was a behavior that might have been learned in infancy, and could be reversed, "The old wives' tale about chewing everything 20 times might be true - if you did take a bit more time eating, it could have an impact."

Jennifer, et.al., (2005), conducted a Cross sectional case-control led study among 356 females aged 12-19 with type 1 diabetes and 1098 age matched non-diabetic controls, with the use of eating disorders meeting Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria. The findings revealed that eating disorders that met DSM-IV criteria were more prevalent in diabetic subjects (36, 10%) than in non-diabetic controls (49, 4%) (Odds ratio 2.4, 95% confidence interval 1.5 to 3.7; $P<0.001$). Sub threshold eating disorders were also more common in those with diabetes (49, 14%) than in controls (84, 8%) (Odds ratio 1.9, 95% confidence interval 1.3 to 2.8; $P<0.001$). Mean hemoglobin A_{1c}concentration was higher in diabetic subjects with an eating disorder (9.4% (1.8)) than in those without (8.6% (1.6), $P=0.04$). DSM-IV and sub threshold eating disorders are almost twice as common in adolescent females with type 1 diabetes as in their non-diabetic peers.

Sharma V & Roth G., (2004) speak about Eating Behavior and Weight Control. They say, if we can regulate the eating behavior, it will automatically regulate the amount of food intake. Over the years, we develop wrong eating habits such as, doing several things together when we eat. These movements and engagement of our mind on some thing else prevents us from getting the cues and signals from our stomach of "fullness." Even if we register the signal of fullness, there is still a problem. Satiation of hunger does not come only from the feeling of "fullness' from the stomach, but also from "food cues" such as, aroma, shape, and texture of food. They satisfy other senses along with the sense of taste. All these messages from various senses and the feeling of fullness of stomach coalesce and send a signal to the brain of satiation of appetite and a psychological satisfaction from eating. As a result, our mechanism of appetite satiation and fulfillment of psychological hunger may be seriously compromised.

Bellisle & Magnen J.,(2003.), observed eating and drinking patterns in lean and obese subjects, during various single or mixed flavor meals of different palatability level and recorded the responses of Chewing and swallowing on an oscillograph, and did a precise temporal analysis of their intrameal eating and drinking patterns. They found that Increasing palatability induced a decrease in chewing activity per food unit and, in the obese only, reduced the duration of intrameal pauses. In lean subjects, chewing time per food unit and intrameal pause duration increased from the beginning to the end of meals, probably due to developing satiation. Obese subjects appeared more stimulated than the lean at intermediate palatability levels. Prandial drinking occurred most often at the end of meals and may serve to enhance sensory stimulation.

Barkelling, Yvonne, Eva & Rooth., (2002) Conducted a study on “VISION AND EATING BEHAVIOUR IN OBESE SUBJECTS” The objective of the study was to investigate the impact of vision on the microstructure of the eating behavior of obese subjects.18 obese subjects with the body mass index of 39.1 twice consumed a standardized test meal in excess, once with and once without a blindfold. The microstructure of the eating behaviour was

registered by VIKTOR, a computerized eating monitor. Subjective motivation to eat was rated by visual analogue scale (VAS) before, immediately after, and then hourly up to 3 hours after the test meals. It was found that the obese patients ate 24% less food when blindfolded. The importance of the vision in regulating our eating behavior was demonstrated in this study. The obese subjects ate 24% less food blindfolded without feeling less full. Eating blindfolded could be tested as a didactic tool to make obese subjects aware of what factors affect the termination of eating.

Minagi. T.,(2000), quoted a study in which Twenty nine persons with type 2 diabetes and 23 non-diabetic control subjects participated. The purpose was to investigate the effect of diabetes and Glycaemic control on salivary function in an older population. Diabetic status of these persons was determined by glycosylated hemoglobin (HbA_{1c}) test and a 2-hour glucose tolerance test. It was found that persons with poorly controlled diabetes had lower (P = .01) stimulated parotid flow rates than persons with well-controlled diabetes and non-diabetic control subjects. There were no significant differences in xerostomic complaints based on diabetic or Glycaemic control status or salivary flow rates. These results provide evidence that poorly controlled diabetes may be associated with salivary dysfunction in older adults who have no concomitant complaints of xerostomia.

CHAPTER – III

METHODOLOGY

Methodology is a systematic way to solve research problem undertaken. The research methodology involves the systematic procedure by which the investigator starts from the initial identification of the problem to its conclusion.

In this chapter the researcher intended to discuss the research design, research setting, population, sample and sample size, sampling technique , sampling criteria, development of tools, description of tools, content validity, reliability, pilot study, data collection procedure and the plan for data analysis and the ethical issues.

The study is to compare the eating behavior of the diabetic and the non-diabetic patients attending out patient department.

RESEARCH DESIGN

The term research design refers to the plan of a scientific investigation. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the researcher's purpose with economy in procedure. (C.R.Kothari).

The research design selected for the study is an observational study comparative in nature. The study intended to observe and compare the eating behavior among the diabetic and the non-diabetic patients using a questionnaire and a Video recording.

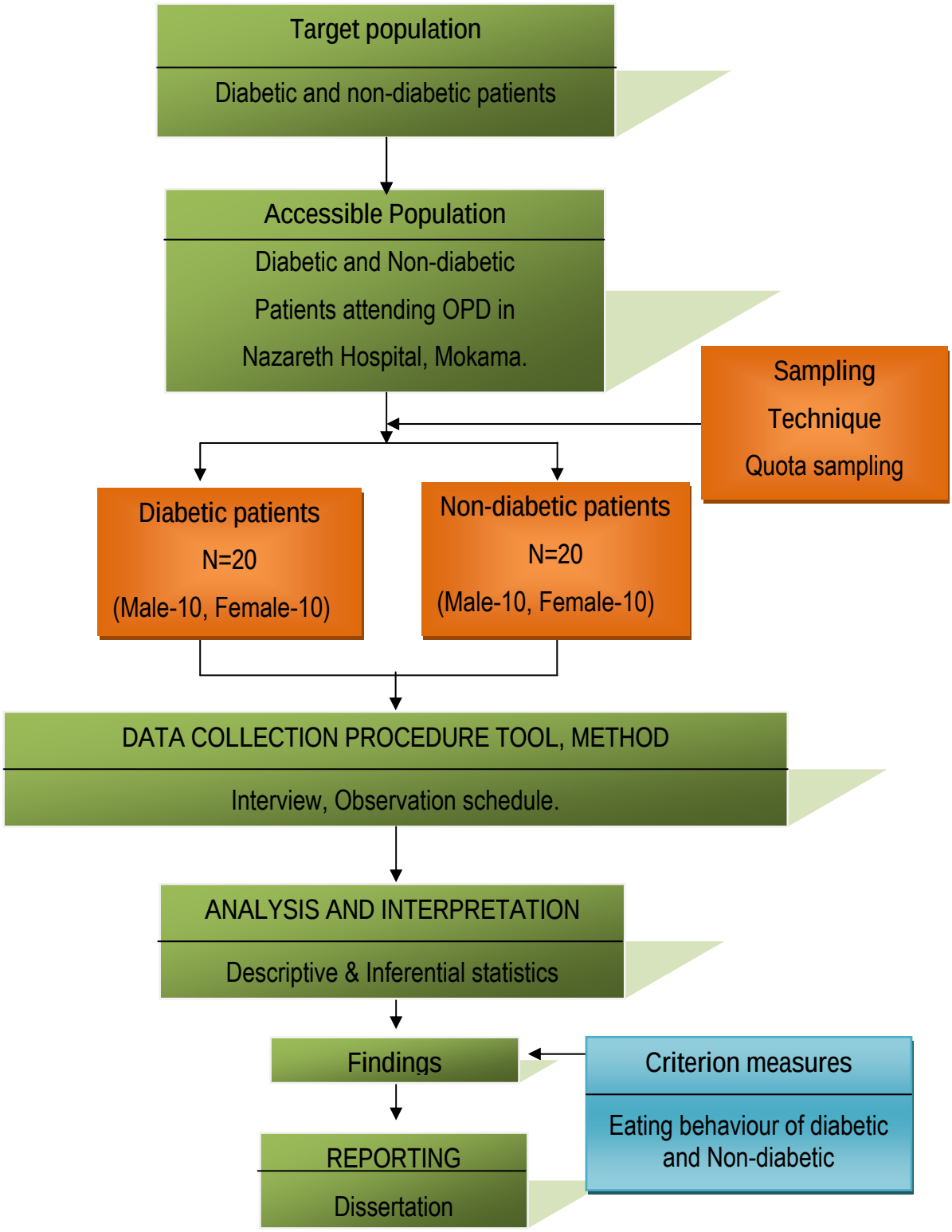


Fig: 2 SCHEMATIC REPRESENTATION OF RESEARCH DESIGN

VARIABLES

The variables included in the study were,

Associate variables –refers to the selected factors such as age, sex, marital status, religion, occupation, family income , family type, dietary teaching, period of illness, number of medical check-up, taking regular treatment , food preference, eating snacks between meals, speed of eating, Body mass Index (BMI), Blood sugar levels, and the characteristics of ingestion.

Dependent variables- refers to the eating behavior, (the amount eaten, total time taken to masticate and number of mastication).

SETTING

The selection of setting was done on the basis of feasibility of conducting the study, availability of sample, convenience to the investigator and the cooperation from the authority. The subjects were selected from Nazareth Hospital, Mokama, Bihar.

POPULATION

Polit and Hungler (2004), referred population as the entire set of individuals or subjects having common characteristics sometimes referred to as universe. Population is of two types- Target population and the accessible population

Target Population: Refers to a set of individuals or objects for which the researcher wishes to generalize findings. The target population in the present study was the diabetic and the non diabetic patients.

Accessible Population: Refers to the portion of target population that is available to the researcher. The accessible population for the present study was the diabetic patients and the non-diabetic patients attending out patient department of Nazareth Hospital, Mokama, Bihar.

SAMPLE AND SAMPLE SIZE

Talbot says," Sample is a subset of population that has been selected to represent the population of interest." Sample size refers to the number of elements to be selected from the universe to constitute a sample. The sample for the study was diabetic and non- diabetic patients attending outpatient clinic in Nazareth Hospital. 40 diabetic patients and non-diabetic were recruited in the study, inclusive of 20 diabetic patients and 20 non-diabetic patients considering the nature of data collection.

SAMPLING TECHNIQUE

Sampling is the process of selecting a subject of a population in order to obtain information regarding a phenomenon in a way that represents the entire population.

In the present study the investigator selected the diabetic and the non- diabetic patients from out patient department of Nazareth hospital using quota sampling.

Diabetic (20)		Non-diabetic (20)	
Male	Female	Male	Female
10	10	10	10

SAMPLE SELECTION CRITERIA

The study samples were selected by the following criteria.

A) Inclusive criteria

a) The persons with diabetic and non-diabetic conditions as diagnosed by the doctor.

b) Patients who attended OPD at the time of data collection

c) Persons who were willing to participate in the study.

d) In the age group of 40- 60 years.

e) Both male and female patients

f) Patients who could speak and understand Hindi.

g) Blood sugar less than 110mg/dl were considered as non- diabetic and blood sugar more than 110mg/dl were considered as diabetic.

B) Exclusive criteria

a) Persons with complications of diabetes mellitus or any other diseases

b) Associated illnesses of oral cavity

c) Gestational diabetes.

d) Those who refused to participate in the study.

e) Those who were practicing diet restriction.

DESCRIPTION OF TOOL

Talbot (1995) says" Data collection is the instrument that measures the variables of the study accurately, precisely, and sensitively. "A questionnaire was prepared based on the past clinical experience of the researcher, related review of literature and the opinions of the subject's experts. For the purpose of the study the investigator developed the items to collect data regarding the background variables and regarding eating behavior .The tool was translated and used in Hindi language. The average time to complete one questionnaire was for 15 minutes and the observation was for 15 minutes.

The interview/ observation schedule had two sections.

Section I - Background factors, consisting of diabetic information and food related information. This section sought information on background variables such as age, sex, marital status, education, occupation, family income, family type, religion, diabetic information such as period of illness, regularity in checking, dietary teaching, blood sugar level, body mass index (BMI), characteristics of ingestion and the food related information like food preference, average gap between meals, snacks between meals, speed of eating and the time when stops eating.

Section II - Observation check list on eating behavior, which consisted of eight statements regarding eating behavior (amount of food, time taken to eat, number of mastication, number of feeding, drinking water while eating,)

CONTENT VALIDITY

The tool constructed by the investigator was sent along with the request for validation to 3 nursing experts, one nutrionist and one physician. The suggestions were considered and modification of tool was done according to the opinion of experts. Translation of the tool was done by language experts and retranslated to English and language validity was confirmed.

PILOT STUDY

The structured tool was administered on 4 patients with diabetes for clarity and understanding. The average time taken for the completing of the questionnaire was 15 minutes and 15 minutes for the observation checklist. This helped to find the feasibility of the tool for language, clarity, sequence and appropriateness of items. The samples in the pilot study were not included in the main study.

RELIABILITY

Reliability was established by test- retest method for section A and inter rater reliability for section B. 4 patients were chosen from the same setting and the tool was administered twice, with the gap of two days. The reliability coefficient for section A was r= 0.6. Items with 100% aggregated were included in the section B. Thus the tool was found to be reliable.

DATA COLLECTION PROCEDURE

Formal approval was obtained from the authorities of Nazareth Hospital. The data was collected for four weeks in the month of October 2009, among diabetic and the non- diabetic patients who attended outpatient department at Nazareth hospital, Sunday was a holiday. On an average 5 patients participated in the study per day.

A total of 40 patients were recruited for the study using sampling method. Initial rapport was established. Explanation on the purpose of the study was done. Informed consent was taken.

Data on background factors were collected. Measures like weight, height were checked and the body mass index was calculated. Random blood sugar of the three visits of the selected patients were collected from the medical records maintained at the hospital.

The participants were led to the room where video camera was fixed. The subjects were given color coded token numbers so that investigator could recognize each diabetic and non-diabetic patient. The subjects were seated in a semicircle. Informed consent was taken prior to the observation. Each one was served 200 grams of cooked chapatti and 100 grams of vegetable. Timings were recorded with the help of the watch. Video recording was done during the process of eating. At the end, remaining food of the individual subjects was weighed with

the help of weighing scale and recorded. After the completion of the procedure the investigator transcribed the data required from the video recording by playing repeatedly. Human assistance to measure the food items and for serving the food was utilized. The subjects responses marked in the appropriate items of the tool. The tool was then edited for completion. The average time taken was 30 minutes.

PLAN FOR ANALYSIS

Data analysis was planned to include both descriptive and inferential statistics. The following plan of analysis was developed.

- Frequency and percentage distribution was used for the analysis of background factors.
- Mean, standard deviation, range, and student 't' test, regression correlation was used to compare the eating behavior of the diabetic and the non- diabetic patients.
- Linear regression was used to find out the association between eating behaviour and selected background factors among the diabetic and the non- diabetic patients.

ETHICAL ISSUES

The research problem and the objectives were approved by the research committee. Proper explanation regarding the purpose of the study and the nature of the questionnaire involved in the study design was given. Due permission from the institutional authorities was sought and informed consent was taken. No physical or psychological harm was caused.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

The analysis and interpretation of data of this study was based on the data collected by interview/observation method. The results were computed using descriptive and inferential statistics. The data were entered into Excel Sheet and analyzed by using SPSS 10 Version. The probability of less than 0.05 was considered to be significant.

The objectives of the study were,

1. To compare the eating bahaviour between the diabetic and the non-diabetic patients.
2. To test the correlation between the blood sugar, BMI and eating behaviour among the diabetic and non-diabetic patients.
3. To test the association between eating behaviour and selected factors among the diabetic and the non-diabetic patients.

The data were analyzed and organized, under the following heading

Section I : Data on background factors of the diabetic and the non-diabetic patients.

Section II : Data on eating behaviour of the diabetic and the non-diabetic patients.

Section III : Data on correlation between blood sugar, body mass index and eating behaviour among the diabetic and the non- diabetic patients.

Section IV : Data on association between selected factors and eating behaviour among the diabetic and the non- diabetic patients.

SECTION-1 DATA ON BACKGROUND FACTORS OF DIABETIC & NON-DIABETIC PATIENTS

TABLE 1

Frequency and percentage distribution of the diabetic and the non-diabetic patients regarding background factors.

Background factors	Diabetic N=20		Non-diabetic N=20		χ^2
	NO	*%*	*NO*	*%*	
1. Age of the client					
a. 40-45years	6	30	8	40	8.190
b. 46-50 years	4	20	10	50	(P= .017)
c. 50 & above	10	50	2	10	S
2. Sex					
a. Male	10	50	10	50	0.100
b. Female	10	50	10	50	(P= .752)
					NS
3. Marital Status					
a. Single	6	30	-	-	
b. Married	14	70	20	100	-
c. Divorced	-	-	-	-	
d. Widow (er)	-	-	-	-	
4. Education					
a. Literate	13	65	12	60	0.107
b. Illiterate	7	35	8	40	(P=.744)
					NS
5. Income					
a. Above 2000/-	10	50	5	25	2.667
b. Below 2000/-	10	50	15	75	(P =.102)
					NS

Background factors	Diabetic N=20		Non-diabetic N=20		χ^2
	NO	*%*	*NO*	*%*	
6. Family type					
a. Joint	11	55	14	70	0. 960
b. Nuclear	9	45	6	30	(P =.327)
					NS
7. How long have you been suffering from diabetics mellitus					
a. 0-5 years	10	50	-	-	
b. 6-10years	6	30	-	-	-
c. 10 years above	4	20	-	-	
8. How often do you check your blood sugar					-
a. Regularly	19	95	-	-	
b. Irregularly	1	5	20	-	
9. Did you receive dietary teaching					
a. Yes	18	90	16	80	19.600
b. No	2	10	4	20	(P= .376)
					NS
10. Body Mass Index					
a. Under weight	5	25	6	30	1.834
b. Normal weight	6	30	9	45	(P =.400)
c. Over weight	9	45	5	25	NS
11. Blood sugar level					
a. Below 100mg/dl	-	-	20	100	
b. 101- 200 mg/dl	8	40	-	-	-
c. 201-300 mg/dl	11	55	-	-	
d. 300 and above	1	5	-	-	

NS – Non Significant

Table-1: Reveals the background data of the diabetic and the non-diabetic patients such as age, sex, marital status, religion, education, occupation, family income, family type, duration of illness, regularity in blood testing and dietary teaching.

Regarding age, majority of the diabetic patients, 10 (50%) was in the age group of 50 and above and least of them (20%) were in the age group of 46-50 years. Majority of the patients among the non-diabetic 10 (50%) were in the age group of 46-50 years and least 2 (10%) were in the ages group of 50 and above years. The obtained chi- square value (χ^2) 8.190 (p= .017) was significant. Therefore the groups were comparable with regard to age.

Regarding sex, both male and female were equally distributed among the diabetic and the non-diabetic patients. The obtained chi – square value (χ^2) 0.100 (p= .752) was not significant. Therefore the groups were comparable with regard to sex.

Regarding martial status, majority of diabetic patients were married 14(70%) and least 6 (30%) were single. Almost all patients 20 (100%) of the non-diabetic patients were married. Therefore the groups were comparable with regard to marital status.

Regarding education, majority of the diabetic patients were literate 13 (65%) and least 7 (25%) were illiterate. Majority of the non-diabetic 12 (60%) were literate and 8 (40%) illiterate. The obtained chi-square value (χ^2) 0.107 (p=.744) was not significant. Therefore the groups were comparable with regard to education.

Regarding income both were equally distributed as (50%) 10. The obtained chi- square value (χ^2) 2.667(p =.102) was not significant. Therefore the groups were comparable with regard to income.

Regarding family type, majority of the diabetic patients belonged to joint family 11 (55%) and least 9 (45%) belonged to a nuclear family. Likewise among the non-diabetic patients 14 (40%) were under joint family, and least 6 (30%) were under nuclear family. The obtained chi-square value (χ^2) 0. 96 (p =.327) was not significant. Therefore the groups were comparable with regard to family type.

Regarding duration of diabetics majority of the diabetic patients have been suffering for the past 5 years. 10 (50%) and least 4 (20%) for more than 10 years. Not applicable to the non-diabetic patients. Therefore the group was comparable with regard to duration of diabetes.

Regarding regularity of medical check up majority of the diabetic patients 19 (95%) had check up regularly and least 1 (5%) not regular, and the non-diabetic patients 20 (100%) were irregular. Therefore the groups were comparable with regard to regularity of medical check-up.

Regarding dietary teaching majority 18 (90%) received teaching on diabetes and least 2 (10%) did not received ay teaching on diabetes likewise among the non-diabetic 16 (80%) received teaching and least 4 (20%) did not receive any teaching on diabetics. The obtained chi-square value (χ^2) 19.600 (p= .376) was not significant. Therefore the groups were comparable with regard to dietary teaching.

Regarding Body Mass index majority 9(45%) were over weight among the diabetic patients and 9(45%) were normal weight among the non- diabetic patients. The obtained chi-square value (χ^2) 1.834(P=.400) was not significant. Therefore the groups were comparable with regard to Body mass index.

Regarding fasting blood sugar level majority of the diabetic patients were 10(50%) were above 200mg/dl and least 1(5%) above 300 mg/dl and among the non-diabetic 20(100%) were below 100 mg/dl. Therefore the groups were comparable with regard to blood sugar level.

It was inferred that majority of the diabetic and the non-diabetic patients were in the age group of 46-50 years, were married, were Hindus, were literate unskilled, below poverty line, are belonging to joint family, irregular in check up, and received dietary teaching.

Fig: 3 reveals the frequency and percentage distribution of the diabetic and the non- diabetic patients regarding religion.

Regarding religion majority of the diabetic patients 16(80%) and 10 (50%) the non-diabetic patients belong to Hindu religion and least 1(5%) were from Muslim religion.

It was inferred that most of the diabetic and the non-diabetic patients were from Hindu religion.

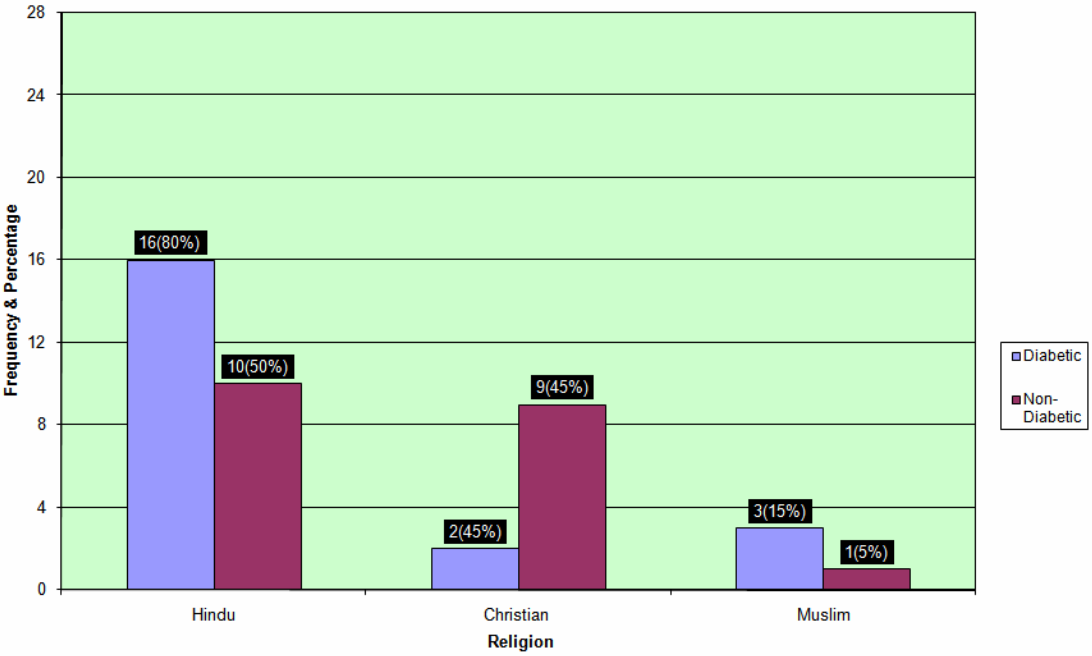


Fig. 3: Frequency and percentage distribution of diabetic non -diabetic patient regarding religion

Fig 4 reveals the frequency and percentage distribution of the diabetic and the non-diabetic patients regarding occupation.

Regarding occupation majority of the diabetic 10 (50%) and the non-diabetic 7 (35%) were from unskilled group.

It was inferred that majority of the diabetic and the non-diabetic patients were unskilled workers.

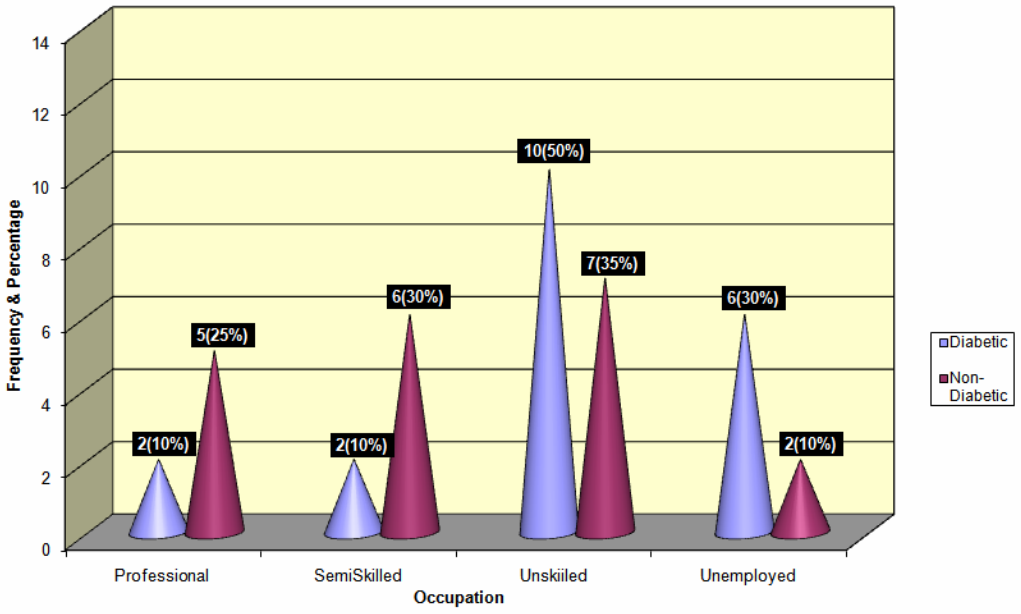


Fig. 4: Frequency and percentage distribution of diabetic and non-diabetic patients regarding occupation

Fig. 5 : reveals the frequency and percentage distribution regarding characteristics of ingestion of the diabetic and the non-diabetic patients.

Regarding characteristics of ingestion majority of the diabetic patients 12(60%) were completely swallowing food and taking in food, and least 2 (10 %) were swallowing food along with water.

Among the non- diabetic patients majority 15(75%) were swallowing food completely and then taking in food while still masticating.

It was inferred that majority of the patients were swallowing food completely and then taking in food.

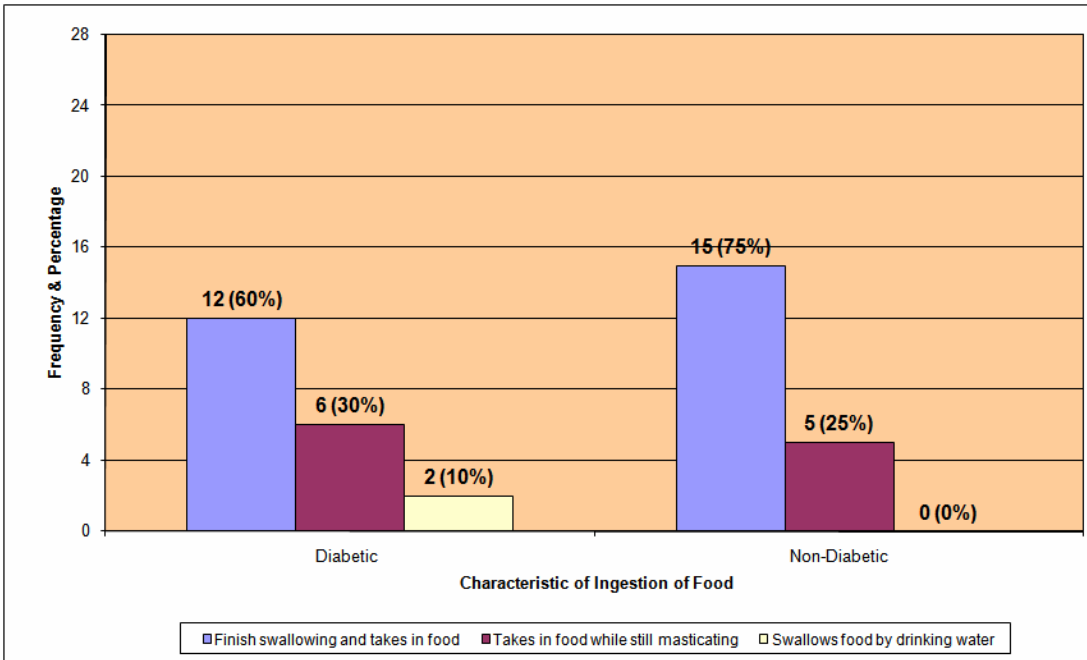


Fig. 3: Frequency and percentage distribution of diabetic non -diabetic patient regarding religion

TABLE – 2

Frequency percentage distribution of the diabetic and the non- diabetic patients regarding food related information

VARIABLES	Diabetic N=20		Non-diabetic N=20		χ^2
	NO	*%*	*NO*	*%*	
1. Food preference					
a. Vegetarían	1	5	-	-	1.034
b. Non- vegetarían	14	70	15	75	(P=.596)
c. Lacto-vegetarían	5	25	5	25	NS
2.Average gap between meals					
a. 3 hours	-	-	-	-	1.026
b. 3-4 hours.	1	5%	-	-	(P =.311)
c. 5 and above	19	95%	20	100	NS
3. Snacks between meals					5.625
a. Yes	7	35%	1	5%	(P =.018)
b. No	13	65%	19	95%	S
4. Speed of eating					
a. slow	4	20%	-	-	7.581
b. Moderate	13	65%	19	95%	(P = .023)
c. fast	3	15%	1	5%	S
5. When do you stop eating					1.613
a. When felt full	11	55%	20	100	(P= .001)
b. When not felt full	9	45%	-	-	S

Table 2 reveals the data on food related information of the diabetic and the non-diabetic patient, such as food preference, average gap between meals, snacks between meals, speed of eating, and time of stopping to eat the food.

Regarding food preference majority of the diabetic patients 14(70%) were non-vegetarian and least 1(5%) were vegetarian. Majority of the non- diabetic patients 15 (75%)

were non- vegetarian and least 5(25%) were lacto- vegetarian. The obtained chi- square value χ^2= 1.034 (P = .596) was not significant. Therefore the groups were comparable with regard to food preference.

Regarding average gap between meals majority of the diabetic patients 19(95%) were giving 3-4 hours of gap and least 1(5%) was giving above 5 hours of gap. Majority of the non- diabetic patients 20 (100%) were giving more than 5 hours of gap. The obtained chi-square value χ^2 = 1.026(P =.311) was not significant. Therefore the groups were comparable with regard to average gap between meals.

Regarding snacks between meals majority of the non-diabetic patients 19(95%) had no snacks between meals compared to diabetic patients 13(65%)The obtained chi- square value χ^2= 5.625(P = .018) was significant. Therefore the groups were not comparable with regard to food preference.

Regarding speed of eating majority of the non- diabetic patients 19(95%) reported medium speed of eating compared to diabetic patients 13(65%). The obtained chi- square value χ^2= 7.581 (P = .023) was significant. Therefore the groups were not comparable with regard to food preference.

With regard to stopping the food all the non-diabetic patients 20(100%) reported that they stopped eating when they were full. However 9 (45%) diabetic patients reported that they stopped eating before they felt full. The obtained chi- square value χ^2= 1.613(P = .001) was significant. Therefore, the groups were not comparable with regard to food preference.

It was inferred that there was significant association between the food related information like eating snacks, speed of eating and stopping to eat when felt full among the diabetic and the non-diabetic patients.

SECTION II: DATA ON EATING BEHAVIOUR OF THE DIABETIC AND THE NON-DIABETIC PATIENTS

For the purpose of the study, the following null hypothesis was stated.

H_{01} : There will be no significant difference in the eating behaviour (number of mastication per minute, mastication per feed, time taken for the entire feed, number of feeding per minute and time taken per feed) between the diabetic and the non- diabetic patients.

TABLE -3

Mean, standard deviation, range, 't' value regarding eating behaviour among the diabetic and the non- diabetic patients.

Eating Behaviour	DIABETIC PATIENTS N= 20			NON-DIABETIC PATIENTS N =20				
	Mean mts	Range	SD	Mean mts	Range	SD	MD	't' Value
Total time taken to eat the entire food	7.8	9.92	5.60	6.82	8.86	2.68	1.07	1.220 (P =.368) NS
Number of mastication per feed	20.75	11.67	3.57	21.75	14.0	4.81	0.727	-0.352 (P = .102) NS
Number of mastication per minute	59.01	31	8.82	63.36	41.67	12.94	0.229	- 1.222 (P=.154) NS
Number of feeding per minute	3.08	0.67	0.239	3.04	1.0	0.248	0.265	-1.132 (P=.599) NS
Time taken per feed (Seconds)	20.75	14	4.0	21.15	13	3.13	-.40	-.352 (P =.727) NS

S = Significant NS = Non Significant

Table-3 reveals significant difference between time, mastication and number of feeding of the diabetic and the non-diabetic patients.

The obtained mean of total time taken to eat entire food is 7.8 among the diabetic and 6.82 among the non- diabetic. The obtained't' value t =1.220(P>0.05) was not significant.

The obtained number of mastication per feed is 20.75 among the diabetic and 21.75 among the non- diabetic patient. The obtained't' value t =-0.352(P>0.0) was not significant.

The obtained number of mean mastication is 59.01 was low among the diabetic and among the non- diabetic patients 63.36. The obtained't' value t= -1.222(P>0.05) was not significant.

The obtained number of feeding per minute is 3.08 was among the diabetic and among the non- diabetic patients 3.04. The obtained't' value t= -1.123 (P>0.05) was not significant.

The obtained time taken per feed is 20.75 was among the diabetic and among the non- diabetic patients 21.15. The obtained't' value t= -1.123 (P>0.05) was not significant.

Therefore null hypothesis H_{01} was accepted. It was inferred that the diabetic and the non- diabetic did not differ regarding total time taken to entire feed, number of mastication per feed, number of mean mastication, number of feeding per minute and the time taken per feed.

For the purpose of the study, the following null hypothesis was stated.

H_{02} : There will be no significant difference in the amount of chapatti and vegetable eaten between the diabetic and the non- diabetic patients.

TABLE – 4

Amount of chapatti eaten by the diabetic and the non-diabetic patients

Group	Amount of Chapatti			
	Mean Grams	Range	SD	't' Value
DM	161.20	150	51.85	-.904 (P >.05) NS
NDM	172.5	148	61.7	

Table 4 refers to mean, standard deviation, range and the amount of chapatti eaten by the diabetic and the non- diabetic patients.

Non- diabetic patients consume more chapatti M= 172.5grams (61.7) than the diabetic patients M= 161.20 (51.85). But the obtained't' value t = -.904 (P >.05) was not significant.

Therefore, it was inferred that there was no difference between the diabetic and the non-diabetic patients regarding chapatti eating.

TABLE – 5

Amount of vegetable eaten by the diabetic and the non- diabetic patients

Group	Amount of Vegetable			
	Mean Grams	Range	SD	't' Value
DM	112.70	74	22.34	-.757 (p =.030) S
NDM	119.50	122	33.41	

Table 5 refers to mean, standard deviation, range and the amount of vegetable eaten by the diabetic and the non- diabetic patients.

Non-diabetic patients consume more vegetable M = 119.50 grams (33.41) than the diabetic patients M= 121.70 (22.34). The obtained t value, t = -.757(p=.030) was significant.

Therefore, it was inferred that the non- diabetic patients significantly consumed more vegetables.

SECTION III: DATA ON CORELLATION BETWEEN BLOOD SUGAR, BODY MASS INDEX AND EATING BEHAVIOUR OF THE DIABETIC AND THE NON-DIABETIC PATIENTS

For the purpose of the study the following null hypothesis were stated

H_{03} :- There will be no significant correlation between the eating behaviour and BMI among the diabetic and the non- diabetic patients.

H_{04} :- There will be no significant correlation between the eating behaviour and blood sugar among the diabetic and the non- diabetic patients.

TABLE 6

Correlation between BMI and the eating behaviour among the diabetic and the non-diabetic patients.

BMI and Eating Behaviour	DM N = 20			NDM N = 20			't' value
	MEAN	SD	RANGE	MEAN	SD	RANGE	
BMI	22.0	0.83	10.04	19.0	0.76	8.31	1.38 (P= .176)
Mean mastication	59	9.26	31	63.36	12.95	41	-1.22 (P= 229)
'r' = - 0.040(P>0.05)				'r' = - 0.028(P>0.05)			
Total time taken per feed	20.75	4.0	14	21.15	3.13	13	-.352 (P= .727)
'r' = 0.205 (P> 0.05)				'r' = - 0.262(P> 0.05)			
Number of feeding per minute	3.10	0.24	0.67	3.05	0.25	1	.428 (P=.671)
'r' = -.447 (P> 0.05)				'r' = 0.293(P> 0.05)			

BMI and Eating Behaviour	DM N = 20			NDM N = 20			't' value
	MEAN	SD	RANGE	MEAN	SD	RANGE	
Total time taken for entire feed	7.81	2.90	9.92	6.74	2.66	8.86	1.220 (P= .230)
'r' = -0.295 (P> 0.05)				'r' = 0.251(P> 0.05)			
Mean mastication per feed	20.21	3.57	11.67	21.73	4.81	14	-1.132 (P= .265)
'r' = -.051 (P> 0.05)				'r' =.025 (P> 0.05)			
Chapatti eaten	161.20	51.85	150	172.50	52.50	152	-.904 (P= .176)
'r' = - .517 (P < 0.05)				'r' = .063 (P> 0.05)			
Vegetable eaten	112.70	22	74	119.50	33.41	122	-.757 (P=.454)
'r' = - .234 (P> 0.05)				'r' = .190 (P> 0.05)			

Table 6 reveals the association mean, standard deviation, range, 't' value, 'r' value between the BMI and the eating behaviour of the diabetic and the non- diabetic patients.

There was low negative correlation between BMI and mean mastication r = .04 (P >0.05); number of feeding per minute, r = -.447 (P>0.05); total time taken for entire feed, r = -.295 (P>0.05) mean mastication per feed, r = -.051 (P>0.05); the amount of chapatti eaten, r = -.517 (P<0.05) and the amount of vegetable eaten r = -.234 (P>0.05) among the diabetic patients. However, they were not significant except the amount of chapatti eaten.

There was low negative correlation between BMI and mean mastication time r = -.028 (P>0.05); and total time taken per feed r = -.262 (P>0.05) among the non- diabetic patients. However, they were not significant.

It was inferred that the trend (or) the direction of correlation was a welcome negative correlation, between BMI and eating behaviour. Also, there was significant negative correlation between BMI and the amount of chapatti eaten among the diabetic patients.

Further low negative correlation between BMI and mean mastication time and total time taken per feed was observed among the non- diabetic patients.

TABLE – 7

Correlation between blood sugar and the eating behaviour among the diabetic and the non- diabetic patients.

Blood sugar and eating behaviour	DM						't' value
	Mean	SD	Range	Mean	SD	Range	
Blood sugar	219.93	38.48	144.67	78.95	10	34	15.85 (P=.000)
Mean mastication Per minute	59	9.26	31	63.36	12.95	41	-1.222 (P=.229)
'r' = -.306 (P> 0.05)				'r' = - .307 (P> 0.05)			
Total time taken per feed	20.75	4.0	14	21.15	3.13	13	-.352 (P=.727)
'r' = .001(P> 0.05)				'r' = - .332(P> 0.05)			
Number of feeding per minute	3.10	.24	0.67	3.05	.25	1	.428 (P=.671)
'r' = .007 (P> 0.05)				'r' = .358 (P> 0.05)			
Total time taken for entire feed	7.81	2.90	9.92	6.74	2.66	8.86	1.220 (P=.230)
'r' = - . 148 (P> 0.05)				'r' = -.023 (P> 0.05)			
Mean mastication per feed	20.21	3.57	14	21.73	4.81	13	-1.132 (P=.265)
'r' = -.302 (P> 0.05)				'r' = -.279 (P> 0.05)			
Chapatti eaten	161.20	22	150	172.50	52.50	152	-.904 (P=372)
'r' = .207(P> 0.05)				'r' = .053 (P> 0.05)			
Vegetable eaten	112.70	22	74	119.50	33.41	122	-.757 (P=.454)
'r' = .187(P> 0.05)				'r' = .200 (P> 0.05)			

Table 7 reveals the association mean, standard deviation, range, 't' value, 'r' value between the blood sugar and the eating behaviour of the diabetic and the non- diabetic patients.

There was low negative correlation between blood sugar and mean mastication per minute r = -.306 (p >0.05); mean mastication per feed, r = -.302(P>0.05); total time taken for entire feed, r = -.148 (P> 0.05) among the diabetic patients. However, they were not significant.

There was low negative correlation between blood sugar and mean mastication per minute r = -0.307, total time taken per feed r = -0.332 (P>0.05); total time taken for entire feed, r = -0.023 (P> 0.05) and mean mastication per feed, r = -0.279 (P> 0.05) among the non-diabetic patients. However, they were not significant. Therefore, null hypotheses Ho_3 and Ho_4 were accepted.

It was inferred that the trend (or) the direction of correlation was a welcome negative correlation, between blood sugar and eating behaviour.

Further low negative correlation between blood sugar and mean mastication time, total time taken for entire feed and mean mastication per feed was observed among the non-diabetic patients.

SECTION - IV: DATA ON ASSOCIATION BETWEEN TOTAL TIME TAKEN FOR FEEDING; MEAN MASTICATION AND SELECTED FACTORS AMONG THE DIABETIC AND THE NON- DIABETIC PATIENTS.

For the purpose of the study the following null hypothesis were stated

H_{05} : There will be no significant association between total time taken for feeding and selected factors among the diabetic and the non- diabetic patients.

H_{06} : There will be no significant association between the mean mastication and selected factors among the diabetic and the non- diabetic patients.

TABLE – 8

Linear regression regarding total time taken for feeding and selected factors among the diabetic patients

Selected factors	*Total time taken for feeding*		
	Standard of co-efficient (Beta)	't' value	significance
1. Age.	0.787	2.449	0.040(S)
2. Sex	0.320	1.013	0.341(NS)
3. Marital status	0.555	1.039	0.329(NS)
4. Religion	-0.097	-0.145	0.888(NS)
5. Education	-0.81	-0.074	0.943(NS)
6. Occupation.	-0.556	-1.030	0.333(NS)
7. Income.	-0.597	0.594	0.569(NS)
8. Family type	0.271	0.703	0.502(NS)
9. Diabetic information.	-0.174	0.374	0.718(NS)
10. Diabetic regularity	0.774	0.953	0.368(NS)
11. Diabetic teaching	-0.374	-0.700	0.504(NS)

S= Significant NS= Non- Significant

Table 8 shows the standardized co-efficient and 't' value regarding eating behaviour and selected factors among the diabetic patients.

The obtained 't' values regarding sex t = 1.013, marital status t = 1.039, religion t = - 0.145, education t = -0.074, occupation t = -1.030, income t =0.594, family type t =0.703, regularity in checkup t = 0.953, diabetic information t = 0.374 and dietary teaching t = - 0.700 were not significantly associated with eating behaviour.

.

The eating behaviour in relation to age was significantly associated t=2.449 (P<0.05).

The selected factors sex, marital status, religion, education, occupation, income, family type, regularity in check-up, diabetic information and dietary teaching showed no significant difference.

However, it was inferred that there was an association between age of the patient and total time taken for feeding ($P<0.05$) among the diabetic patients.

TABLE – 9

Linear regression regarding total time taken for feeding and the selected factors among the non- diabetic patients

Selected factors	*Total time taken per feed*		
	Standard of co-efficient (Beta)	't' value	Significance
Age.	0.641	1.204	0.315(NS)
Sex	0.075	0.136	0.901(NS)
Marital status	0.199	0.85	0.938(NS)
Religion	2.680	0.859	0.453(NS)
Education	3.421	0.589	0.599(NS)
Occupation.	0.198	0.115	0.916(NS)
Income.	-2.099	-.451	0.683(NS)
Family type	-0.384	-0.154	0.887(NS)
Diabetic information.	-2.159	-1.084	0.358(NS)
Diabetic regularity	-0.718	-0.174	0.873(NS)
Diabetic teaching	0.939	0.304	0.781(NS)

The table 9 reveals the standardized coefficient and 't' value regarding food related information and selected factors among the non- diabetic patients based on linear regression.

The obtained 't' values regarding age t =1.204, sex t = 0.136, marital status t = 0.85, religion t = 0.859 education t = 0.586, income t = -0.451, family type t = 0.154, education t = 0.589, income t = - 0.451, family type t = -0.154, diabetic information t = -1.084, regularity in checking t = -1.74, dietary teaching t = 0.304, were not significant (P>0.05).

Therefore, it was inferred that there was no significant association between total time taken per feed and selected factors among the diabetic patients.

TABLE – 10

Linear regression regarding mean mastication among the non-diabetic patients and their selected factors

Selected factors	*Mean Mastication of Diabetic patients*		
	Standardized co-efficient	*'t'*	*significance*
Age.	-1.087	-2.237	0.111(NS)
Sex	0. 742	1.477	0.236(NS)
Marital status	-0.572	-0.267	0.806(NS)
Religion	-1.931	-0.678	0.546(NS)
Education	-2.383	-0.447	0.685(NS)
Occupation	-1.077	-0.687	0.541(NS)
Income	1.887	0.445	0.687(NS)
Family type	-0.825	-0.363	0.741(NS)
Duration of diabetes	1.332	0.733	0.517(NS)
Regularity in checking	0.328	0.087	0.936(NS)
Dietary teaching	0.350	0.125	0.909(NS)

S= Significant. NS= Non- significant

The table 10 reveals the standardized co-efficient and 't' value regarding food related information and selected factors among the diabetic patient.

The obtained 't' value regarding age t = 2.237, sex t = 1.477, marital status t = -0.267, religion t = -0.678, income t = 0.445, family type t = -0.87, duration of diabetes t =0.733, Regularity in checking t =0.087, and diabetic teaching t = 909, were not significant (P>0.05).

Therefore, it was inferred that there was no significant association between mean mastication and the selected factors among the diabetic patients.

TABLE – 11

Linear regression regarding mean mastication among the non- diabetic patients and their factors

Selected factors	*Mean Mastication of the Non- diabetic patients*		
	Standardized co-efficient	*'t'*	*significance*
Age.	.199	.571	.608(NS)
Sex	.425	1.180	.323(NS)
Marital status	-1.101	-.718	.525(NS)
Religion	-.034	-.017	.988(NS)
Education	.251	.066	.952(NS)
Occupation	.117	.104	.924(NS)
Income	-.608	-.200	.855(NS)
Family type	-1.080	-.662	.555(NS)
Duration of diabetes	.815	.626	.576(NS)
Regularity in checking	-1.093	-.406	.712(NS)
Dietary teaching	1.414	.701	.534(NS)

S= Significant NS= Non-significant

Table 11 reveals that linear regression on mean mastication among non-diabetic patients and the background factors such as age, sex, marital status, religion, education, occupation, income, family type, diabetic information, dietary teaching,

The obtained 't' values regarding age t = 571(P = .608), sex t = 1.180 (P = .323); marital status t= -.718 (P= .525); religion t=-.017(P=.988); education t=.066 (P=.952); occupation t=.104 (P=.924); income t=-.200 (P=.855); family type t =-.662 (P=.555); Diabetic information t= .626 (P= .576); regularity in checking t =-.406 (P=.712); dietary teaching t =.701(P= .534); were not significant in relation to mastication.

Therefore Null hypotheses H_{05} and H_{06} were accepted.

Therefore, it was inferred that there was no significant association between mean mastication and the selected factors among the non- diabetic patients.

CHAPTER – V

SUMMARY, FINDINGS, DISCUSSION, IMPLICATIONS, LIMITATIONS RECOMMENDATIONS AND CONCLUSION

The essence of any research project is based on study findings, limitation, interpretation of the result and recommendations that in- corporate the study implication. It also gives meaning to the results obtained in the study.

SUMMARY

The primary aim of the study was to compare the eating behaviour of the diabetic and the non- diabetic patients in selected hospital, Mokama, Bihar.

The objectives of the study were

1. To compare the eating behavior between the diabetic and the non-diabetic patients.
2. To test the correlation between the BMI, blood sugar, and the eating behaviour among the diabetic and the non-diabetic patients.
3. To test the association between eating behavior and selected factors among diabetic and non-diabetic patients.

The study attempted to examine the following research hypothesis

H_1 : There will be a significant difference in the eating behaviour (number of mastication per minute, mastication per feed, time taken for the entire feed, and time taken per feed) between the diabetic and non- diabetic patients.

H_2 : There will be a significant difference in the amount of chapatti and vegetable eaten between the diabetic and the non- diabetic patients.

H_3 : There will be a significant correlation between the eating behaviour and BMI among the diabetic and the non- diabetic patients.

H_4 : There will be a significant correlation between the eating behaviour and blood sugar among the diabetic and non- diabetic patients.

H_5 : There will be a significant association between total time taken for feeding and selected factors among the diabetic and the non- diabetic patients.

H_6 : There will be a significant association between the mean mastication and selected factors among the diabetic and the non- diabetic patients.

The review of literature enabled the investigator to develop conceptual framework, tool and methodology of the study. Literature of review was done for the present study and presented under the following headings; 1) Studies related to eating behaviour. 2) Studies related to mastication and obesity. 3) Studies related to chewing of food and diabetes and 4) studies related to eating behaviour and obesity.

The conceptual framework adopted for the present study was based on the HEALTH BELIEF MODEL (Rosenstoch's, Maiman's1974). This model helped the investigator to compare the eating behaviour among diabetic and the non- diabetic patients.

The research approach adopted for the study was an observational study, comparative in nature. The independent variable in the study was diabetes mellitus and the dependent variable was eating behaviour among diabetic and the non- diabetic patients.

The tool developed and used for data collection was an interview/ observation schedule. 5 experts established the content validity of the tool. The reliability of the tool was established by test- retest reliability method and inter rater reliability. The reliability coefficient was

calculated and was 0.06. The tool was found to be reliable and feasible. The tool was tested for its clarity among 5 diabetic patients from Nazareth Hospital, Mokama, Bihar.

The main study was conducted in Nazareth Hospital, OPD, Mokama, Bihar. The data was collected for 4 weeks in the month of October 2009. Prior permission was sought and obtained. Informed consent was obtained from the diabetic and the Non- diabetic patients after explaining the purpose of the study. Confidentiality of information was assured. The samples were selected by quota sampling technique based on the sample selection criteria. 40 patients (20 diabetic and 20 non- diabetic) were selected. The observation was done in the mid-morning during which the video recording of the eating behaviour was done. The collected data was analyzed and interpreted by using SPSS package (Version 10) at the level of 0.05 level of significance based on the study objectives.

CHARACTERISTICS OF THE STUDY SAMPLE

Majority of the diabetic patients 10 (50%) were in the age group of 50 and above, were married 14(70%), were literate 13 (65%), belonged to joint family 11 (55%), have been suffering for the past 5 years (50%), had check up regularly 19 (95%), received teaching on diabetes 18 (90%), over weight 9(45%) blood sugar was above 200mg/dl 10(50%), belonged to Hindu religion 16(80%), unskilled group 10 (50%) and swallowing food completely and taking in food were 12(60%), were non- vegetarian 14(70%), giving 3-4 hours of gap 19(95%), taking snacks between meals 13(65%), moderate speed in eating 13(65%) and stopped eating until full 11(55%) .

Majority of the non-diabetic patients 10 (50%) were in the age group of 46-50 years, 20 (100%) were married, 12 (60%) were literate, 14 (40%) belonged to joint family, had irregular check-up 20 (100%), received teaching 16 (80%), normal weight 9(45%), blood sugar was below 100 mg/dl 20(100%), belonged to Hindu religion 10(50%), unskilled group 7 (35%) and

were swallowing food completely and taking in food 15(75%), non- vegetarian 15(75%), giving more than 5 hours of gap 20(100%), not taking 20(100%) and were not statistically significant. However, with regard to sex and income diabetic and non- diabetic patients were equally distributed as 10(50%). and were not significant.

The diabetic patients and the non- diabetic patients were not comparable with regard to age $\chi^2 = 8.19$ ($P< 0.05$); taking snacks $\chi^2 = 5.6$($P <0.05$); speed of eating $\chi^2 = 7.58$($P<0.05$) and stopped eating after being full $\chi^2 = 1.61$($P <0.05$).

FINDINGS

The major findings of the study were presented based on the objectives of the study.

Objective 1: To compare the eating behavior between the diabetic and the non-diabetic patients.

- There was significant difference in the amount of vegetable eaten among the diabetic and the non-diabetic patients t = -0.757 ($P <0.05$). Non- diabetic ate more vegetable than the diabetic patients.

- There was no significant difference in the amount of chapatti eaten among the diabetic and non- diabetic patients t = -0.904 ($P> 0.05$)

- There was no significant difference in the eating behaviour [number of mastication per minute t = - 1.222 ($P>0.05$); mastication per feed t = - 0.352 ($P>0.05$); time taken for the entire feed t = 1.220 ($P>0.05$); number of feeding per minute t = 1.132 ($P>0.05$) and time taken per feed t = -.352 ($P>0.05$)] between the diabetic and non-diabetic patients.

Objective 2: To test the correlation between the BMI, blood sugar, and the eating behaviour among the diabetic and the non-diabetic patients.

- There was a significant correlation between BMI and the amount of chapatti eaten r = .517 among diabetic patients. (P<0 .05).

- There was no significant correlation between BMI and mean mastication (r = -0.040); total time taken per feed (r = 0.205); number of feeding per minute (r = -.447); total time taken for entire feed (r = - 0.295); mean mastication per feed (r = -.051); and vegetable eaten (r = -.234) among diabetic patients (P>0.05) There was no significant correlation between BMI, and mastication per minute (r =-0.028); total time taken per feed (r= - 0.262); number of feeding per minute (r = 0.293); total time taken for entire feed (r = 0.251); mean mastication per feed (r = .025); chapatti eaten (r = .063); and vegetable eaten (r = .190) among non-diabetic patients (P>0.05).

- There was no significant correlation between blood sugar and mean mastication per minute (r = -.306); total time taken per feed (r = .001); number of feeding per minute (r = .007); total time taken for entire feed (r = -.148); mean mastication per feed (r = -.302); chapatti eaten (r = .207); and vegetable eaten (r = .187) among diabetic patients (P >0.05).

- There was no significant correlation between blood sugar and mean mastication per minute (r = -.307); total time taken for entire feed (r = -.023); and mean mastication per feed (r = -.279); total time taken per feed (r = -.332); number of feeding per minutes (r = 0.358); chapatti eaten (r = .053) and vegetable eaten (r = 0.200) among non- diabetic patients. (P >0.05).

Objective 3: To test the association between eating behavior and selected factors among diabetic and non-diabetic patients.

- There was significant association between the age of the patient and the total time taken for feeding among the diabetic patients t=2.449(P<0.05).
- There was no significant association between total time taken for feeding and the selected factors regarding sex t = 1.013, marital status t = 1.039, religion t = - 0.145, education t = -0.074, occupation t = -1.030, income t =0.594, family type t =0.703, regularity in checkup t = 0.953, diabetic information t = 0.374 and dietary teaching t = - 0.700 among the diabetic patients. (P >0.05).
- There was no significant association between the total time taken and the selected factors regarding age t =1.204, sex t = 0.136, marital status t = 0.85, religion t = 0.859 education t = 0.586, income t = -0.451, family type t = 0.154, education t = 0.586, income t = - 0.451, family type t = -0.154, diabetic information t = -1.084, regularity in checking t = -1.74, dietary teaching t = 0.304, were not significant among the non- diabetic patients.(P>0.05).
- There was no significant association between the mean mastication and selected factors regarding age t = 2.237, sex t = 1.477, marital status t = -0.267, religion t = -0.678, income t = 0.445, family type t = -0.87, duration of diabetes t =0.733, regularity in checking t =0.087, and diabetic teaching t = 909, among the diabetic patients (P>0.05).
- There was no significant association between the mean mastication and selected factors regarding age t =0.571, sex t = 1.180; marital status t= -.718, religion t=-.017, education t=.066, occupation t=.104, income t=-.200, family type t =-.662, diabetic information t= .626, regularity in checking t =-.406, and dietary teaching t =.701, among the non- diabetic patients.(P>0.05).

DISCUSSION

Finding 1: related to eating behaviour among the diabetic and non- diabetic patients

- There was significant difference in the amount of vegetable eaten among the diabetic and the non-diabetic patients t = -.757 (P <0.05).
- There was no significant difference in the amount of chapatti eaten among the diabetic and non- diabetic patients t = - .904 (P> 0.05)
- There was no significant difference in the eating behaviour [number of mastication per minute t = - 1.222 (P>0.05); mastication per feed t = - 0.352 (P>0.05); time taken for the entire feed t = 1.220 (P>0.05); number of feeding per minute t = 1.132 (P>0.05) and time taken per feed t = -.352 (P>0.05)] between the diabetic and non-diabetic patients.

The diabetic and the non- diabetic did not differ regarding their eating behavior (number of mastication per minute, mastication per feed, time taken for the entire feed, and time taken per feed) .

The above findings were supported by Bridget et. al., (2008) in which she found that hunger was acutely suppressed below baseline ($P < 0.05$), and fullness was elevated above baseline longer ($P < 0.05$) after 40 chews than after 25 chews. Two hours after consumption, fullness levels were significantly lower after 25 chews than after 40 chews and hunger levels were significantly higher after 25 chews than after 40 chews ($P < 0.05$).and insulin concentrations declined more rapidly after 25 and 40 chews than after 10 chews(both $p < 0.05$). Chris (2008) reported that with powerful act of eating slower, we can begin to feel better and reverse that lifestyle immediately. Take smaller bites, chew each bite slower and longer and enjoy your meal longer. Kathleen J. et.al., (2008)compared and studied the impact of slow and quick eating rates observed that slow rates of ingestion led to significant decreases

in energy intake (quick: 645.7±155.9 kcal; slow: 579.0±154.7 kcal; *P*<0.05) and significant increases in water consumption (quick: 289.9±155.1 g; slow: 409.6±205.8 g; *P*<0.05).

Finding 2: related to correlation between the BMI, blood sugar, and the eating behaviour among the diabetic and the non-diabetic patients.

- There was a significant correlation between BMI and the amount of chapatti eaten r = .517 (P<0 .05) among diabetic patients.
- There was no significant correlation between BMI and mean mastication (r = -0.040); total time taken per feed (r = 0.205); number of feeding per minute (r = -.447); total time taken for entire feed(r = - 0.295); mean mastication per feed (r = -.051); and vegetable eaten (r = -.234) among diabetic patients.
- There was no significant correlation between BMI, and mastication per minute (r = -0.028); total time taken per feed (r= - 0.262); number of feeding per minute (r = 0.293); total time taken for entire feed (r = 0.251); mean mastication per feed (r = .025); chapatti eaten (r = .063); and vegetable eaten (r = .190) among non-diabetic patients. (P>0.05).
- There was no significant correlation between blood sugar and mean mastication per minute (r = -.306); total time taken per feed (r = .001); number of feeding per minute (r = .007); total time taken for entire feed (r = -.148); mean mastication per feed (r = -.302); chapatti eaten (r = .207); and vegetable eaten (r = .187) among diabetic patients (P >0.05).
- There was no significant correlation between blood sugar and mean mastication per minute (r = -.307); total time taken for entire feed (r = -.023); and mean mastication per feed (r = -.279); total time taken per feed (r = -.332); number of feeding per minute (r = .358); chapatti eaten (r = .053) and vegetable eaten (r = .200) among non- diabetic patients.(P >0.05).

The above findings were similar to Hidehiko et.al., (2005) but not significant with regard to, the effect of mastication on postprandial plasma glucose concentration and compared usual and thorough mastication in subjects with normal glucose tolerance. In the NGT group, thorough mastication reduced the postprandial plasma glucose concentration at 90 minutes (P < .05) and 120 minutes, (*P* < .05).

Finding 3: related to association between eating behavior and the selected factors among diabetic and non-diabetic patients.

- There was significant association between age of the patient and the total time taken for feeding among the diabetic and the non- diabetic patients (P<0.05).
- There was no significant association between total time taken for feeding and the selected factors regarding sex t = 1.013, marital status t = 1.039, religion t = - 0.145, education t = -0.074, occupation t = -1.030, income t =0.594, family type t =0.703, regularity in checkup t = 0.953, diabetic information t = 0.374 and dietary teaching t = - 0.700 among the diabetic patients.(P >0.05).
- There was no significant association between the total time taken and the selected factors regarding age t =1.204, sex t = 0.136, marital status t = 0.85, religion t = 0.859 education t = 0.586, income t = -0.451, family type t = 0.154, education t = 0.586, income t = - 0.451, family type t = -0.154, diabetic information t = -1.084, regularity in checking t = -1.74, dietary teaching t = 0.304, were not significant among the non- diabetic patients.(P>0.05).
- There was no significant association between the mean mastication and selected factors regarding age t = 2.237, sex t = 1.477, marital status t = -0.267, religion t = -0.678, income t = 0.445, family type t = -0.87, duration of diabetes t =0.733, regularity in checking t =0.087, and diabetic teaching t = 909, among the diabetic patients(P>0.05).

- There was no significant association between the mean mastication and selected factors regarding age t = 571, sex t = 1.180; marital status t= -.718, religion t=-.017, education t=.066, occupation t=.104, income t=-.200, family type t = -0.662, diabetic information t= .626, regularity in checking t =-.406, and dietary teaching t =.701, among the non- diabetic patients.(P>0.05).

The above findings were supported by the following studies Laurie & Barclay (2008) conducted a cross sectional study among 3287 adults (1122 men, 2165 women), aged 30 to 69 years compared with the group of participants of both sexes who reported not eating until full and not eating quickly, the group who reported eating until full and eating quickly had the highest age-adjusted mean values for height, weight, body mass index, and total energy intake. Elizabeth & Karen (2008) talk about fast eaters who get fat. She says that eating slowly could help with the battle of the bulge. The findings of the study suggest that those who ate their meals quickly were about twice as likely to be obese as their slow- munching counterparts were. People who ate quickly and who ate until they were full were three times more likely to be obese.

IMPLICATIONS

The findings of the study have the following implications in nursing practice, research and education

Nursing Practice and Research

- Eating behaviour has effect on the diabetic and the non- diabetic patients. Nurses can use this comparative observational study to educate patients upon life modification techniques in the eating behaviour.
- Vegetable eating was significantly high among the non- diabetic patients. Therefore, individuals need to be encouraged to eat more vegetable.
- Age was associated with time taken for feeding. Therefore, younger people must be advised to eat slowly.

- The amount of chapatti need to be regulated according to the desired BMI because BMI and eating chapatti were significantly and positively correlated.
- The finding of the study would help to expand the scientific body of professional knowledge upon which further research can be conducted.
- Nurses can attempt observation studies regarding patient assessment and activities.

LIMITATIONS

The study had following limitations:

- Eating behaviour was video recorded for once only.
- Non-random sampling was done.
- Study was done on limited samples.
- This was the maiden experience of the investigator.
- Groups were not comparable with regard to age, taking snacks and speed of eating among the diabetic and the non- diabetic.
- Factors such as family, urgency to go home by the participants could have been confounder in the study.
- One observation of the eating behaviour of the patient was not sufficient to overcome the participant's bias and factors such as urgency, familial problems, and work related issues were not controlled.

PERSONAL EXPERIENCE

- The investigator has gained lot of new information and experience in many ways beginning from the searching for the research problem until the submission of the report.
- The investigator faced many problems selecting the literature and observation of the eating behaviour.

- Besides the struggle and the tension, learning and doing research was quite interesting and is very helpful for the future.
- Investigator got limited literature review, which is closely related to the study.

RECOMMENDATIONS

- More number of observations will alleviate the participant's bias.
- A similar study may be in a different setting with repeated intervention and observation could be for more useful for generalization of findings.
- A similar study can be done on large samples.
- Study can be replicated in different setting.
- A longer period of intervention can be studied for more reliability and effectiveness.
- A qualitative study of eating behaviour can be done taking into consideration different age group, at a different time of the day and with different food materials with at least 3 observations.
- Comparable groups with regard to age, taking snacks; self reported speed of eating need to be recruited.

CONCLUSION

The following conclusions were drawn from the findings of the study. Based on their report, there was significant association between eating snacks, speed of eating, and stopping to eat when felt full among the diabetic and the non-diabetic patients. Life modification is essential in a world of modernization and globalization. Eating fast leads to stress in our bodies, which is unhealthy living. With one, simple but powerful act of eating slower, we can begin to feel better and reverse that lifestyle at once. Eating vegetable, eating slower, balancing chapatti to our BMI and avoiding snacks are welcome suggestions from this study, to both the diabetics and the non- diabetics.

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APPENDIX – I

LETTER REQUESTING OPINION AND SUGGESTIONS OF EXPERTS FOR ESTABLISHING CONTENT VALIDITY OF RESERCH TOOL.

From

30083603
II year M.Sc (Nursing),
Annai J. K. K Sampoorani Ammal College of Nursing
Komarapalayam,
Namakkal district.

To,

Through
The Dean,
Annai J K K Sampooraniammal College of Nursing,
Komarapalayam,
Namakkal District.

Sub: Letter requesting consent to validate the tool.

Respected Sir/ Madam,

I, 30083603, II year M.Sc., Nursing student of Annai J. K. K Sampoorani Ammal College of Nursing Komarapalayam, under the Tamil Nadu Dr. M G R Medical University, Chennai. As a partial fulfillment of M.Sc Nursing Programme, I am conducting a research on the following topic "An observational study to compare the eating behaviour among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar."

Herewith, I am sending the tool for content validity for your expert opinion. I humbly request your self to spare a little of your valuable time for me, for which I remain ever grateful to you. It would be very kind of you to return the same undersigned at the earliest.

Thanking you,

Place: Yours sincerely,
Date: (30083603)

APPENDIX – II

LIST OF EXPERT

1. MRS. JESSIE SUDARSANAM, MSc.
   HOD Medical surgical nursing,
   Annai.J.K.K.Sampoorani Ammal College of nursing,
   Komarapalayam.

2. Mrs. MADONNA BRITTO, MSc.
   Principal, College of Nursing.
   St. John's National Academy of health Sciences.
   Sarjapur Road,
   Bangalore.

3. Dr. SHANTHI SCN.MBBS, MD
   Nazareth Hospital,
   MOKAMA P.O
   Patna District,
   Bihar.

4. Mrs. MARTIL CHACKO
   Nutritionist,
   St. John's National Academy of health Sciences.
   Sarjapur Road,
   Bangalore.

5. Miss. SHOBANA, Msc(N)
   Medical Surgical department.
   Annai.J.K.K.Sampoorani Ammal College of nursing,
   Komarapalayam.

APPENDIX – III

CONTENT VALIDITY CERTIFICATE

I, hereby certify that I have validated the tool of, 30083603, II yr M.S.c Nursing student of Annai J.K.K.M. Sampoorani Ammal College of Nursing, Komarapalayam, who is undertaking the following study "An observational study to compare the eating behaviour among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar."

Date:

Place:

Signature of the expert

Designation and address.

APPENDIX – IV

LETTER SEEKING PERMISSION TO CONDUCT RESEARCH STUDY

From,

30083603
II year M.Sc (Nursing),
Annai J. K. K.M. Sampoorani Ammal College of Nursing,
Komarapalayam- 638183,
Namakkal District.

To,

Sr. Nirmala Mulackal,
Administrator,
Nazareth hospital,
Mokama, P.O.
Bihar.

Through,

The Dean,
Annai J. K .K. M. Sampoorani Ammal College of Nursing,
Komarapalayam- 638 183,
Namakkal District.

Sub: Seeking permission to conduct the research study.

Respected sister,

I, 30083603, II year M.Sc., nursing student of Annai J. K. K.M. Sampoorani Ammal College of nursing, under the Tamil Nadu Dr. M G. R Medical University, Chennai.

As a partial fulfillment of university requirement for an award of Master of Science in Nursing Degree, I am conducting a research on the following topic "An observational study to compare the eating behaviour among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar."

I would like to avail the patients attending OPD from your esteemed hospital for the research. Please grant permission for the same.

Thanking you,

Place: Yours faithfully,
Date 30083603

APPENDIX – V

LETTER GRANTING PERMISSION TO CONDUCT RESEARCH STUDY

NAZARETH HOSPITAL
MOKAMA P.O.
PATNA DIST., INDIA
803 302

Code - 06132
ADM - 232367
OPD. - 232303

From,
The Administrator,
Nazareth Hospital,
Mokama P.O,
Patna Dist. Bihar
PIN- 803302

To,
The Dean,
Annai J. K .K. M. Sampoorani Ammal College of Nursing,
Komarapalayam-
Namakkal Dist.
PIN- 638 183,

Subject:- Completion of data collection on Diabetic and non-Diabetic patients visiting Out Patient Department.

Respected Sir,

We are happy to inform you that 30083603 has completed the required study on the subject: "An observational study to compare the eating behavior among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar"as a partial fulfillment of Msc Nursing curriculum requirements.

She was very enthusiastic and committed to the task whole heartedly. It was encouraging to see her in action.

I wish her success and good luck in all her endeavors.

Yours sincerely,

Sister Nirmala Mulackal
Administrator

Administrator
NAZARETH HOSPITAL
MOKAMA, PATNA DIST.
PIN – 803 302

APPENDIX – VI

INFORMED CONSENT FORM OF THE SUBJECTS

I ----------understood that I am being asked to participate in a study conducted by Sister ---------- Msc (N), 11 year from Annai J.K.K. Sampoorani Ammal College of Nursing on "An observational study to compare the eating behaviour among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar." The study has been explained to me. I realize that my participation in this study is entirely voluntary, and I may withdraw from the study at any time. I understand that all study data will be kept confidential and will not be utilized for any other purpose. I have read and understood this consent form, all of my questions have been cleared and I agree to participate in this study.

Signature of the subject Date

Signature of the investigator Date

APPENDIX – VII

CERTIFICATE

NAZARETH HOSPITAL
MOKAMA P.O.
PATNA DIST., INDIA
803 302

Code - 06132
ADM - 232367
OPD. - 232303

From,
The Administrator,
Nazareth Hospital,
Mokama P.O,
Patna Dist. Bihar
PIN- 803302

To,
The Dean,
Annai J. K .K. M. Sampoorani Ammal College of Nursing,
Komarapalayam-
Namakkal Dist.
PIN- 638 183,

Subject:- Completion of data collection on Diabetic and non-Diabetic patients visiting Out Patient Department.

Respected Sir,

We are happy to inform you that 30083603 has completed the required study on the subject: "An observational study to compare the eating behavior among the diabetic and the non-diabetic patients attending OPD in Nazareth Hospital, Mokama, Bihar" as a partial fulfillment of Msc Nursing curriculum requirements.

She was very enthusiastic and committed to the task whole heartedly. It was encouraging to see her in action.

I wish her success and good luck in all her endeavors.

Yours sincerely,

Sister Nirmala Mulackal
Administrator

Administrator
NAZARETH HOSPITAL
MOKAMA, PATNA DIST.
PIN – 803 302

APPENDIX – VIII

OBSERVATION INTERVIEW MODULE ON EATING BEHAVIOUR OF DIABETIC AND NON-DIABETIC PATIENTS

SECTION A
BACKGROUND PROFILE

INSTRUCTION

The interviewer is requested to ask the question and read the responses one by one and place a tick (✓) in the given box against the responses given by the client.

GENERAL INFORMATION

1. Age
   a) 40-45 years ☐
   b) 46-50 years. ☐
   c) 51-55 years. ☐

2. Sex
   a) Male ☐
   b) Female ☐

3. Marital status
   a) Single ☐
   b) Married ☐
   c) Widow/ Widower ☐
   d) Separated. ☐

4. Religion

a) Hindu ☐

b) Christian ☐

c) Muslim ☐

d) Any other specify ☐

5. Education

a) Literate (can read or write) ☐

b) Illiterate (Cannot read or write) ☐

6. Occupation

a) Professional(teacher, engineering, lawyer) ☐

b) Skilled worker(Gold smith, carpenter, contractor) ☐

c) Semiskilled(tailor, business man, cook) ☐

d) Unskilled ☐

e) Unemployed ☐

7. Family income (Rupees per Month)

a) Above poverty line ☐

b) Below poverty line ☐

8. Family type

a) Joint ☐

b) Nuclear ☐

c) Extended ☐

DIABETIC INFORMATION

9. How long have you been suffering from Diabetes Mellitus?

a) 0-5 years ☐

b) 6- 10 years ☐

c) 10 years above ☐

10. How often do you check your blood sugar?

a) Once a month ☐

b) Once in three months ☐

c) Once in 6 months ☐

d) Once a year ☐

e) Not very regular. ☐

11. Did you receive dietary teaching regarding Diabetes Mellitus?

a) Yes ☐

b) No ☐

12. Blood sugar level

(a) -------mg/dl (b) --------g/dl (3) --------mg/dl (From the record)

FOOD RELATED INFORMATION

1. State your food preference.

a) Vegetarian ☐

b) Non- vegetarian ☐

c) Lacto vegetarian ☐

d) Ova vegetarian ☐

e) Lacto ova vegetarian. ☐

2. What is the average gap you give between meals?

a) 3 hours ☐

b) 3-4 hours ☐

c) 5 hours and more ☐

3. Do you take snacks between meals?

a) Yes ☐

b) No ☐

4. How do you rate the speed of your eating?

a) Slow ☐

b) Moderate ☐

c) Fast ☐

5. In your assessment when do you stop eating?

a) When you are full stomach ☐

b) When not in full stomach. ☐

SECTION –B

OBSERVATION CHECK LIST

INSTRUCTION

As the food is being consumed by the patient the observation will be done by the investigator through video recording and will be filled in the place given below.

1. Number of chapattis eaten----------numbers.

(Given minus remaining.)

2. Amount of vegetable eaten ----------grams

(Given minus remaining)

3. Total time taken to eat the given food----------minutes.

4. Number of mastication per minute---------

(01---------- 02---------03--------)

5. Number of feeding per minute----------

(01---------- 02---------03--------)

6. Number of mastication per feed per minute----------numbers.

a.....

b.....

c.....

7. Characteristics of ingestion

a. Finish swallowing and takes in food.

b. Takes in food while still masticating.

c. Swallows food by drinking water.

7. Number of times drinking water while eating/minute.

A. Nil

b. 1-2 times.

c. 3 and above.

8. Total time taken per feed.

----------seconds.

APPENDIX – IX

मधुमेह पीड़ित रोगियों की खाने की आदत का निरीक्षण साक्षात्कार मापदण्ड

खण्ड "क "

पृष्टभूमि की रुपरेखा

अनुदेश

साक्षात्कार लेने वाले से अनुरोध है कि एक-एक कर प्रश्न पूछें और ग्राहक (क्लाइंट) द्वारा दिये गये जवाब को उचित जगह में सही( ) का निशान लगावें।

सामान्य जानकारी

1. उम्र

क - 40 - 45 वर्ष
ख - 46- 50 वर्ष
ग - 51 - 55 वर्ष

2. लिंग

क - पुरुष
ख - महिला

3. वैवाहिक स्थिति

क - अविवाहित
ख - विवाहित
ग - विधवा ६ विधुर
घ - तलाकसुदा

4. धर्म

क - हिन्दु
ख - ईसाई
ग - मुस्लिम
घ - अन्य (स्पष्ट करें)

5. शिक्षा

क - साक्षर (जो लिख एवं पढ़ सकता हैं)
ख - निरक्षर (जो लिख पढ़ नहीं सकता हैं)

6. व्यवसाय

क - पेशावर (शिक्षक, इंजीनियर, वकील इत्यादि)

ख - हुनर कर्मी (सोनार, बढ़ई, ठेकेदार इत्यादि)

ग - अर्ध हुनर कर्मी (दर्जी, बार्वची, छोटा अवसायी इत्यादि)

घ - मजदुर

ड - बेरोजगार

7. पारिवारिक आय (रुपये प्रतिमाह)

क - गरीबी रेखा से ऊपर

ख - गरीबी रेखा से नीचे

8. परिवार का रूप

क - संयुक्त परिवार

ख - एकल परिवार

ग - विस्तृत परिवार

<u>मधुमेह की जानकारी</u>

9. कितने समय से आप मधुमेह (डायविटिज मेलीटसी) से ग्रसित है।

क - 0 - 5 वर्ष

ख - 6 - 10 वर्ष

ग - 10 वर्ष से ज्यादा

10. प्राय कितनी बार आप ब्लड सुगर की जॉच करवाते हैं ।

क - महिना में एक बार

ख - तीन माह में एक बार

ग - छः माह में एक बार

घ - नियमित रूप से नहीं

11. क्या आप मधुमेह बीमारी के लिए निर्देशित खाद्य पदार्थ को लेते हैं ?

क - हॉ

ख - नहीं

12. ब्लड सुगर का स्तर

क. ..... मि.ग्राम/डे.ली. ; ख. ..... मि.ग्राम /डे.ली. ; ग. ..... मि.ग्राम/डे.ली.

भोजन संबंधित जानकारी

1. आप किस आहार को प्राथमिकता देते हैघ

    क. शाकाहारी

    ख. मांसाहारी

    ग. दुग्ध शाकाहारी

    घ. अण्डा शाकाहारी

    ड़. दुग्ध-अण्डा शाकाहारी

2. कितने अन्तराल पर आप भोजन लेते हैं ?

    क. 3 घंटे

    ख. 3 . 4 घंटे

    ग. 5 घंटे

3. क्या दो भोजन अवधि के बीच नाश्ता लेते है ?

    क. हॉ

    ख. नहीं

4. आपकी खाने का रफ्तार गति कैसा हैं ?

    क. धीरे-धीरे

    ख. मध्यम गति से

    ग. तेज गति से

5. आप खाना कब बन्द करते हैं ?

    क. जब पूरा पेट भर जाता है ।

    ख. जब पूरा पेट नहीं भरता है ।

खण्ड ''ख''

निरीक्षण जॉच सूची

अनुदेश

शोधकर्ता को रोगी के खाने के तरीकों का निरीक्षण विडियों रिकॉडिंग करके करना हैं और निम्नलिखित खाली स्थान को भरें :-

1. खाये गये रोटी की संख्या.....।

2. खाये गये सबजी की मात्रा ..... ग्राम ।

3. दिये गये खाद्य को खाने में लगा समय ..... मिनट ।

4. प्रति मिनट चबाने की संख्या .....

(01.....02 ..... 03.....)

5. प्रति मिनट निगलने की संख्या ..... ।

(01.....02 ..... 03.....)

6. प्रति मिनट में कितने बार खद्य लिया गया ..... ।

7. खाने की आदत

क. अच्छी तरह से निगलना और दुबारा मुहॅ में खाना लेना ।
ख. बिना निगले फिर मुहॅ में खाना डालना ।
ग. पानी के घुट के साथ निगलना ।

8. खाते समय पानी पीने की संख्या/प्रति मिनट

क. कुछ नहीं
ख. 1.2 बार
ग. 3 से ज्यादा

APPENDIX – X

PROCEDURE FOR OBSERVATION OF EATING BEHAVIOUR

Background factors like weight, height and fasting blood sugar will be measured prior to the observation of eating behavior.

STEPS OF THE PROCEDURE

1. Video camera was fixed in the room for the recording of the observation.
2. The subjects were given color coded token numbers, so that investigator could recognize the each subject who was diabetic and non- diabetic.
3. The subjects were made to sit in a semicircle.
4. Informed consent was taken prior to the observation.
5. Each one was served 200 grams of cooked chapatti (4 in number) and 100 grams of cooked vegetable.
6. Timings were recorded with the help of stop watch. During this process of eating the video- recording was done.
7. At the end of eating the remaining food of every individual was weighed.
8. After the completion of the entire procedure the investigator transcribed the data required from the video recording.
9. Human assistants to measure to food items and for serving the food were utilized.

ABSTRACT

An observational study to compare the eating behavior among the diabetic and non-diabetic patients attending OPD in Nazareth hospital, Mokama, Bihar, was undertaken by 30083603 as a partial fulfillment of the requirement of the degree of Master of Science in Nursing from Annai J.K.K Sampoorani Ammal College of Nursing, Komarapalayam under Tamilnadu Dr. M.G.R Medical University, August 2009-2010.

The objectives of the study were to compare the eating behavior between the diabetic and the non-diabetic patients. To test the correlation between the BMI, blood sugar and eating behaviour among the diabetic and the non-diabetic patients. And to test the association between eating behavior and selected factors among diabetic and non-diabetic patients.

The hypothesis of the study were; 1)There will be a significant difference in the eating behaviour (number of mastication per minute, mastication per feed, time taken for the entire feed, and time taken per feed) between the diabetic and the non- diabetic patients. 2) There will be a significant difference in the amount of chapatti and vegetable eaten between the diabetic and the non- diabetic patients. 3) There will a significant correlation between the eating behaviour and BMI among the diabetic and the non- diabetic patients. 4) There will be a significant correlation between the eating behaviour and blood sugar among the diabetic and the non- diabetic patients. 5) There will be a significant association between the total time taken for feeding and selected factors among the diabetic and the non- diabetic patients. 6) There will be significant association between the mean mastication and selected factors among the diabetic and the non- diabetic patients.

The investigator organized the review of literature under four sections as follows; Studies related to eating behaviour. Studies related to mastication and obesity, Studies related to eating behaviour and obesity and Studies related to mastication and diabetes.

The conceptual framework for the study was based on Health belief model. The research design used was an observation an study comparative in nature Sample size was 40 patients with 20 diabetics (10 males, 10 females) and 20 non- diabetic (10 males, 10 females), attending OPD at Nazareth hospital, Mokama, Patna, Bihar.

The samples were selected by quota sampling. The data were collected by the use of Interview, observation schedule developed by the investigator. The tool was validated by five experts. The main study was conducted at Nazareth hospital, Mokama, Bihar. The data was tabulated, analyzed and interpreted using SPSS package (version 10)

The finding of the study revealed that non-diabetics significantly ate more vegetables than diabetics. There was significant positive correlation between chapatti eaten and BMI among diabetic patients. Age of the diabetic patients was significantly associated with the total time taken for feeding. There was an significant association between snacks, speed of eating and stopping to eat when felt full among the diabetic and the non-diabetic patients.

The study concluded by stating the fact that the eating behaviour has an effect on the diabetic as well as non- diabetic patients. The implication, recommendation, and conclusion were stated adequately.